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The Emu

A Quarterly Magazine to popularize the Study and Protection
of Native Birds.

Official Organ of the ROYAL AUSTRALASIAN ORNITHOLOGISTS' UNION. ✓



Editors { J. A. LEACH, D.Sc., Col. M. B.O.U.
CHARLES BARRETT, C.M.Z.S.

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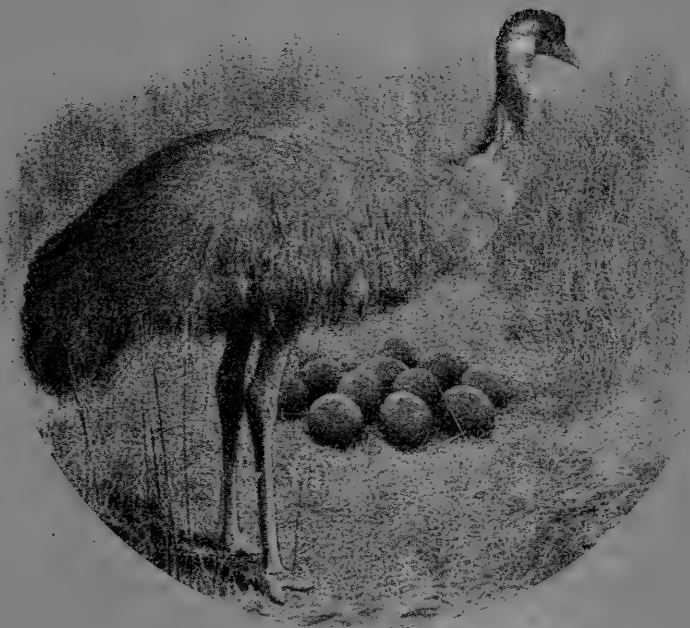
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[Part 1.

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1. *Red-checked Parrot.*
(*Geoffroyus macleannani.*)
2. *Red-sided Parrot.*
(*Eclectus macgillivrayi.*)

The Emu

Official Organ of the Royal Australasian Ornithologists' Union.

"Birds of a feather."

VOL. XIV.]

1ST JULY, 1914.

[PART I.

Two New Genera of Parrots for Australia.

BY GREGORY M. MATHEWS, F.R.S.E.

AUSTRALIAN ornithologists are indebted to Dr. Wm. Macgillivray, R.A.O.U., for being instrumental in adding these new birds to our list. They are not the only new birds brought to light from this locality, but are important enough to be figured. Perhaps the others will be so in the near future. It is very extraordinary that these common Parrots should have escaped observation till last year.

Geoffroyus geoffroyi.

[*Geoffroyus geoffroyi geoffroyi*.

Psittacus geoffroyi, Bechstein, Kurze Uebers Vögel, p. 103, pl. xxi, 1811; "New Holland" = Timor. Extra limital.]

Geoffroyus geoffroyi maclennani. Red-cheeked Parrot.

Pseudopsittacus maclennani, Macgillivray, *Emu*, vol. xiii., p. 105, 1913; Pascoe River, North Queensland. Range, North Queensland.

Electus pectoralis.

[*Electus pectoralis pectoralis*.

Psittacus pectoralis, P.L.S., Müller, Syst. Nat. Suppl., p. 78, 1776; "China" = New Guinea. Extra limital.]

Electus pectoralis macgillivrayi. Red-sided Parrot.

Electus pectoralis macgillivrayi, Mathews, Austral Av. Rec., vol. ii.; Pascoe River, North Queensland. Range, North Queensland.

[Members are indebted to Dr. Macgillivray and Mr. Mathews for defraying the expenses of the accompanying coloured plate.—EDS.]

The Myology of the Bell-Magpie (*Strepera*) and its Position in Classification.

By J. A. LEACH, D.Sc., COL. M. B.O.U.

My purpose in entering on an examination of the Bell-Magpie (*Strepera*) was to endeavour to find evidence that would settle the vexed question as to whether that bird was more closely related to *Corvus* or to *Gymnorhina* and *Cracticus*. The work was carried out in the laboratories of the Biology School, University of Melbourne, under the personal supervision of Acting-Professor T. S. Hall, to whom I am indebted for many valuable suggestions and much helpful advice and direction. I am also indebted to Mr. J. A. Kershaw, F.E.S., Curator National Museum, Melbourne, for the loan of specimens and literature.

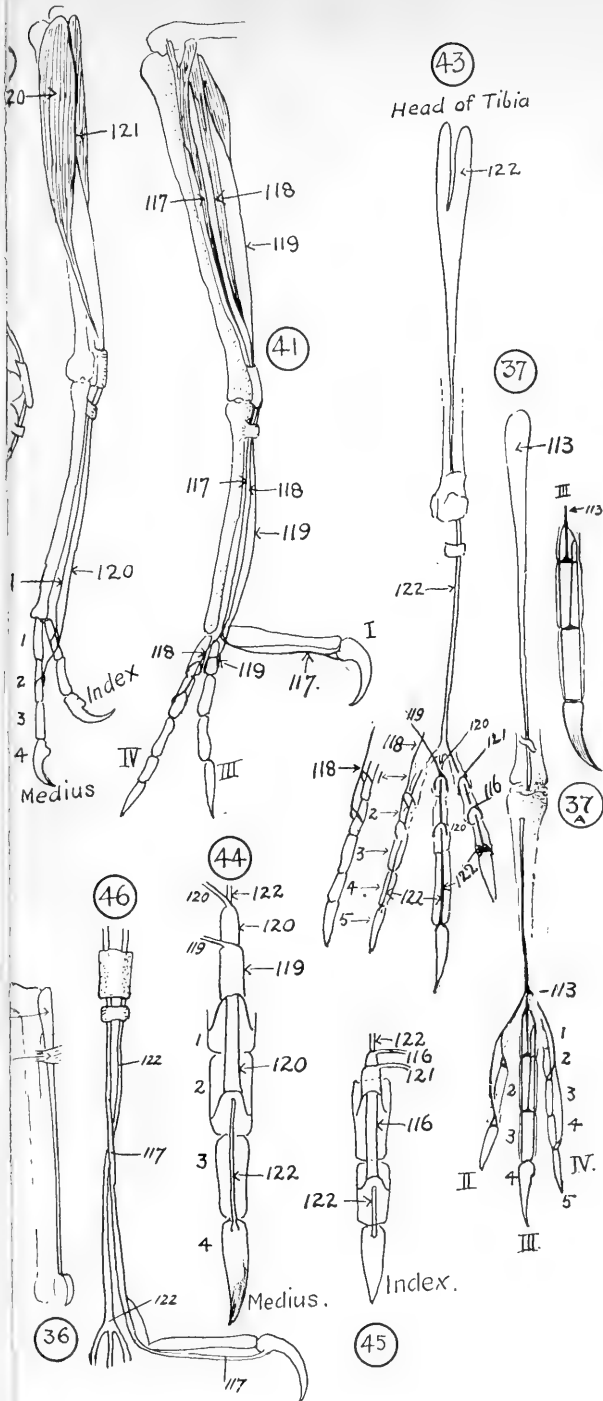
Gould was quite satisfied on this point, for he said, in the "Introduction to the Birds of Australia," page 33, the relationship of the birds of the genus *Strepera* "to the *Corvidæ*, to which they have been usually assigned, is very remote, their size and colour being, in fact, the only features of resemblance. Their whole structure and economy are, indeed, very different from those of every other bird known, except those of *Gymnorhina* and *Cracticus*, with which genera they form a very natural group, most nearly allied to the great family of the *Laniidæ*, or Shrikes."

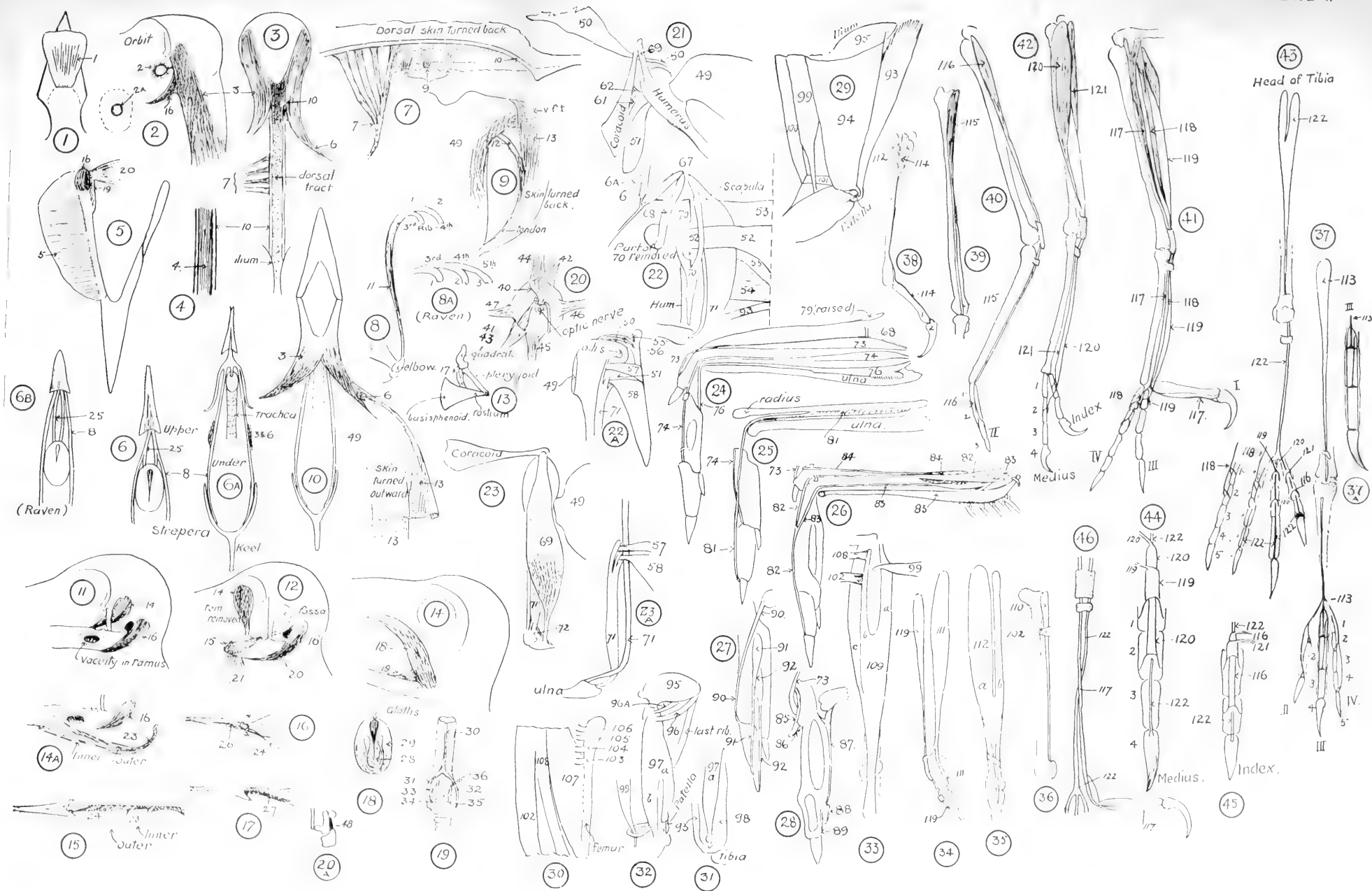
The late Dr. Bowdler Sharpe, on the other hand, seemed unable to make up his mind on the point. In the "Catalogue of Birds in the British Museum," vol. iii., page 57, Sharpe placed *Strepera* in the *Corvidæ*, away from *Gymnorhina* and *Cracticus*. In vol. iv. of his more recently published "Hand-list of Birds," on page 278, he placed *Strepera* in the sub-family *Gymnorhinæ* of the *Laniidæ*. Mathews, apparently following Sharpe's manuscript of vol. v. of the "Hand-list of Birds," placed *Strepera* in the *Corvidæ* in his "Hand-list of the Birds of Australasia." When vol. v. of the "Hand-list of Birds" appeared, it was seen that Sharpe had placed *Strepera* in the family *Streperidæ*, following the *Corvidæ*, and had left *Gymnorhina* and *Cracticus* in the *Laniidæ*.

Mathews, in his "Reference-list," 1912, again included *Strepera* in the *Corvidæ*. He further suppressed the genus *Gymnorhina*, and placed the birds now included in that genus in the older genus *Cracticus*; *Cracticus* was left in the *Laniidæ*. It was in the hope of settling whether *Strepera* was related to *Corvus* or to *Gymnorhina* that this work was undertaken. The results show that *Strepera*, *Gymnorhina*, and *Cracticus* are closely related, and form a natural group, probably as much entitled to family rank as many of the so-called families of the Oscines section of the Passeriformes. All writers admit the great difficulty of classifying the Oscines, for more than half of the 19,000 species of birds are included in that group. Parker exclaimed, "One hundred classifiers, one hundred so-called systems!"

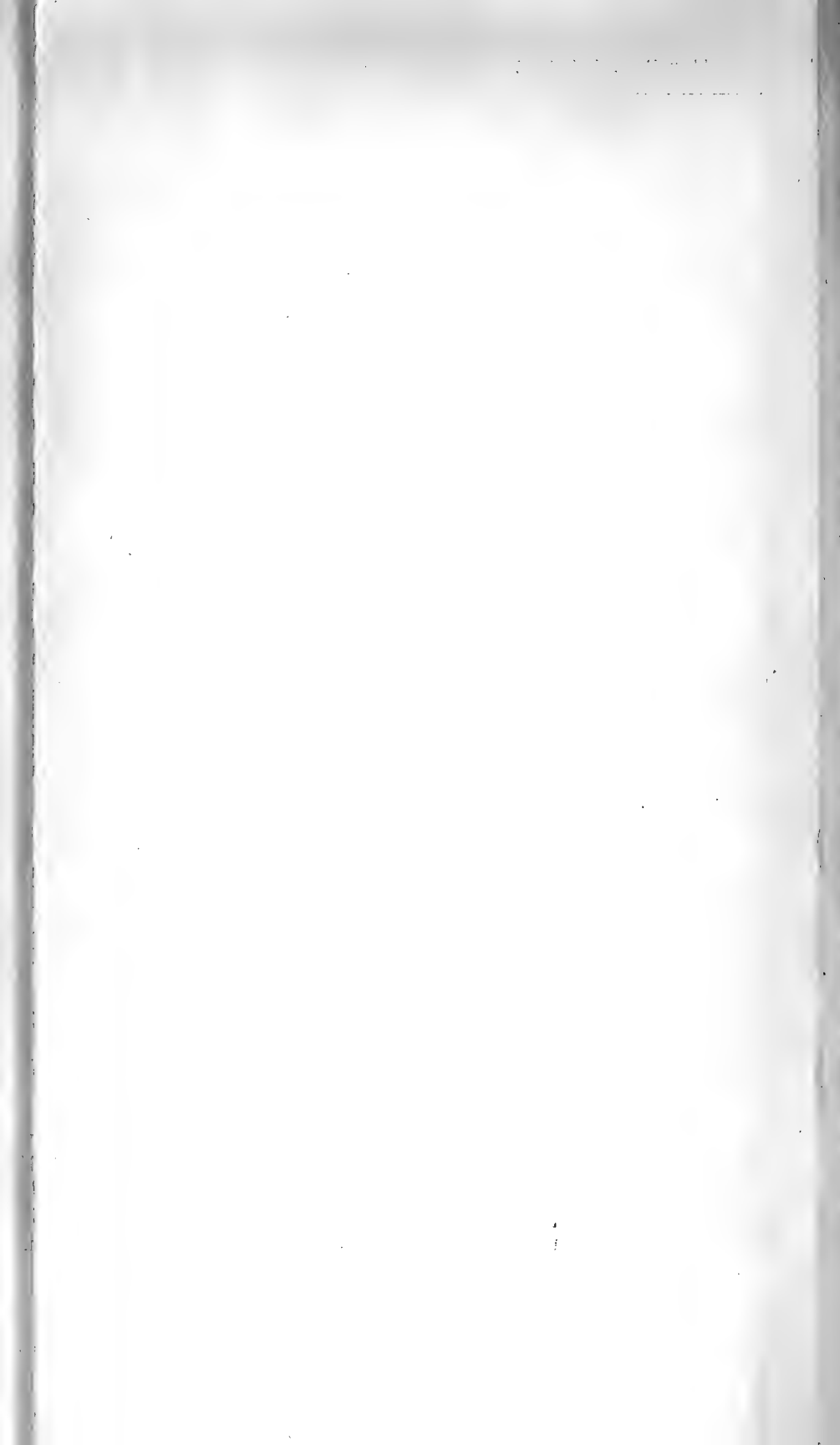
Dr. Shufeldt made a detailed study of the myology of the Raven, which he published under that title. It was thought

PLATE I.





The numbers refer to the muscles as in the text.



that a detailed examination and comparison of the myology of *Strepera* with that of the Australian Raven, *Gymnorhina*, and *Cracticus*, and an examination of characters of taxonomic value, would yield evidence of a definite nature. The results support Gould's belief that *Strepera* is closely related to *Gymnorhina* and *Cracticus*. If one of these birds differs from the Raven in the position and size of a muscle, all three differ, and they differ little amongst themselves.

Professor W. K. Parker, in the "Transactions of the Zoological Society," vol. ix., 1877, page 327, said:—"In all respects, physiological, morphological, and ornithological, the Crow may be placed at the head, not only of its own great series, birds of the *Crow-form*, but also as the unchallenged chief of the whole of the *Carinatae*." He further placed *Gymnorhina* almost equal in rank with it, at the head of another important section. He said, concerning *Gymnorhina*:—"Suggesting to the observer its own name, Crow, with a modifying epithet, Piping, this is yet a bird which is the culmination of a very different branch of the *Ægithognathæ* from that of the true Crows of the Old World. There are not many internodes between this upper type and the Chilian and Brazilian birds that grow out below it." Again, referring to the posterior lateral processes on the palatines, he said:—"These peculiar styliform trans-palatines are found, so far as I have seen, only south of or upon the equator, and their very curious character, always correlated with other characters, might justify me in dividing the *Coracomorphæ* into *Noto-coracomorphæ* and *Arcto-coracomorphæ*." Parker, apparently, did not examine *Strepera* or *Cracticus*. In the "Dictionary of Birds" Newton uses the term "Austro-coraces" for these birds "leading to the Crows."

Ridgway referred to Parker's views, and on page 253 of his "Birds of North and Middle America," 1904, considered that these birds should form the family *Streperidæ*. He said:—"Several of the Old World types which have been referred to the *Corvidæ* are more or less aberrant, and some of them certainly do not belong here. Among the latter may be specially mentioned the Australian genus *Strepera*, which, with the genus *Cracticus*, has by some authors been referred to the *Laniidæ*, though a more consistent view of their relationship would entitle them to the rank of a family, *Streperidæ*. Besides the *Streperidæ* and *Laniidæ*, the nearest relations of the *Corvidæ* seem to be the *Paradiseidæ*." Ridgway, on page 254, states that "America possesses nearly half the undoubted *Corvidæ* enumerated by Dr. Sharpe in his catalogue of the *Corvidæ* in the British Museum." In a footnote he says:—"The genera *Strepera*, *Struthidea*, *Picathartes*, *Glaucopis*, *Heteralocha*, *Creadion*, *Palculia*, *Graculus*, *Pyrrhocorax*, *Corcorax*, and *Podoces* are excluded from the above enumeration as being more or less doubtfully members of the family." *Struthidea* and *Corcorax* are "anomalous" Australian birds that apparently should be the subjects of a detailed examination.

Pycraft, in an article in the "Proceedings of the Zoological Society," on "The Osteology of the Gymnorhines," fills in some of the internodes referred to by Parker when he said, "There are not many internodes between this upper type (*Gymnorhina*) and the Chilian and Brazilian birds that grow out below it." Pycraft placed *Gymnorhina* at the summit of a branch of the Passeriformes. Apparently he did not examine *Strepera* or *Cracticus*.

THE MYOLOGY OF STREPERA.

In describing the muscles of *Strepera*, much assistance has been received from Shufeldt's "Myology of the Raven." As *Strepera* has the same arrangement for most of the muscles, and as Shufeldt has given a full synonymy and abundant references in notes to the classical works of Owen, Gadow, and Furbringer, his arrangement, names, and numbers for the different muscles have been adopted.

THE DERMAL MUSCLES.

There are 13 muscles named and described by Shufeldt as being connected with the skin of a Raven. These skin muscles, with the possible exception of the *dermo-ulnaris* (11), are probably more or less closely united. A bird shakes its feathers after a dust bath. One can readily conceive that, in order to work the feathers simultaneously, there should be a more or less intimate connection between the different skin muscles.

The 13 muscles have been named by Shufeldt as follow :—

1. The *dermo-frontalis*.
2. The *circumconcha*.
3. The *dermo-temporalis*.
4. The *dermo-dorsalis*.
5. The *platysma myoides*.
6. The *dermo-tensor patagii*.
7. The *dermo-cleido dorsalis*.
8. The *cleido-trachealis*.
9. The *dermo-spinalis*.
10. The *dermo-iliacus*.
11. The *dermo-ulnaris*.
12. The *dermo-humeralis*.
13. The *dermo-pectoralis*.

1. The *dermo-frontalis* [1].* Shufeldt describes this as being present only in old male Ravens. He says :—"It is about 3 centimetres long and a few millimetres wide, closely attached to the skin." I find a fine muscle stratum underlying the feathers of the head tract in *Strepera* † and the Australian Raven. Possibly the Australian Raven has not the fine muscle band, but

* A number in brackets [] refers to a diagram on plate 1 or 2. A number in parentheses () is the consecutive number used for the muscle by Shufeldt in "The Myology of the Raven."

† The species examined were *Strepera graculina*, *Corvus australis*, *Gymnorhina tibicen*, *Cracticus destructor*.

it certainly has a muscle stratum under the skin of the head. If this is not what Shufeldt meant, then it is a muscle not described by him. Shufeldt noticed in a living domesticated Raven that the bird could make the feathers above the eyes, "lateral crests," stand up so as to be very evident, not to say conspicuous.

2. The *circumconcha* [2] [2a] in the *Strepera* is, as Shufeldt describes, a muscle in the "periphery of the ear-conch." It is closely attached to the skin, and arises by a neat little tendon from the end of the supraoccipital crest.

3. The *dermo-temporalis* [3] [6a] [10] is, in *Strepera*, an important skin muscle. It is probably connected with all the skin muscles except the *dermo-ulnaris* (11). In *Strepera* the two *dermo-temporales* fuse directly with the *dermo-iliacus* (10) at either side of the narrow dorsal feather tract; anteriorly, they are united by means of a strong fascia. The two *dermo-temporales* unite on the ventral surface and ensheath the neck. Fibres from the *dermo-trachealis* (8) and from the *dermo-tensor patagii* (6), the muscle which sends a tendon along the propatagium to the wrist, unite with the *dermo-temporalis* on each side. Fibres from the muscle (13) of the ventral feather tract join at about the same place, thus intimately connecting the various skin muscles (3), (6), (8), and (13).

The *dermo-temporalis* on each side arises fleshy from the hinder part of a ridge outside the orbit and above and anterior to the temporal fossa. It extends down the sphenotic process, behind and partly under the ear, covers the *temporal* muscle (14), and runs back to the dorsal feather tract, where part of it passes directly back on to the *dermo-iliacus* (10). It spreads round the throat, and covers the *cleido-trachealis* (8), some fibres fusing with that muscle. The two *dermo-temporales* muscles (3) fuse in front of the neck, thus ensheathing it, as shown in figure [10].

4. The *dermo-dorsalis* [4] is the skin muscle underlying the dorsal feather tract; it is covered with fat. Along each side of it the *dermo-iliacus* (10) runs as a definite narrow muscle. *Strepera* agrees with the Australian Raven, *Gymnorhina*, and *Cracticus* in the arrangement of this muscle. The American Raven, as described by Shufeldt, differs. He says:—"It (the *dermo-dorsalis*) is most prominent in the middle of the neck, where it is enclosed in a fold of the integument." In the Australian birds it is the *dermo-iliacus* (10) that is enclosed in a fold of the integument at the side of the feather tract.

The *dermo-dorsalis* becomes fainter as the head is approached, but is probably continuous with the *dermo-frontalis* (1). The *dermo-dorsalis* (4) is lost posteriorly over the caudal region.

5. The *platysma-myoides* [5] is a thin fascia with a few muscle fibres, and meets its fellow of the other side under the chin.

6. The *dermo-tensor patagii* [3] [6a] [10] [22].—Shufeldt separates the propatagium from the parapatagium, the fold between the

root of the neck and the shoulder. In the free edge of the parapatagium is a muscle, the fibres of which spread out on the neck, joining a fasciculus receiving fibres from the *dermo-temporalis* (3), the *cleido-trachealis* (8), and the *dermo-pectoralis* (13). At the distal end in *Strepera* a tendon almost immediately joins the tendon of the *tensor patagii longus* (67). Its action is to help that muscle. The *dermo-tensor patagii* (6) is described by Shufeldt as a variable muscle. He said:—"Were the variations all known and appreciated, I am confident that they would be characters of considerable taxonomic value." *Gymnorhina* and *Cracticus* agree with *Strepera*. The Raven differs in having a fairly long tendon for the *dermo-tensor patagii* before it joins the tendon from the *tensor-patagii longus* (67). The tendon is very elastic.

6a. The muscle [10] [22] underlying the humeral feather tract joins the *dermo-tensor patagii* by a definite muscle band.

7. The *dermo-cleido dorsalis* [7] arises from the upper inner face of the clavicle. It spreads out fanwise in several distinct branches on a mesentery, which runs vertically upwards. Some of its fibres join the *dermo-dorsalis* (4), and the *dermo-iliacus* (10), and some spread out over the skin on the outer side of the last-named muscle.

8. The *cleido-trachealis* [6] [6a] [10] arises from the lower part of the clavicle. It is a definite, narrow muscle, and runs along the edge of the clavicle for some distance, then passes on to the neck, where it gives some fibres to the fasciculus already referred to as being joined by fibres from muscles (3) (6) and (13). It passes on as a narrow definite band to the outer side of the upper larynx, where a junction is made.

The muscle now runs to the upper side, and in *Strepera*, *Gymnorhina*, and *Cracticus* it joins the *sterno-hyoideus* (25). In the Australian Raven [6b] it does not join with that muscle, but keeps outside of it, running forward to be inserted into the base of the tongue external to the insertion of the *sterno-hyoideus* (25). Shufeldt described a different arrangement in the American Raven. He says the *cleido-tracheales* "are finally inserted, touching each other by their inner borders on the anterior aspect of the superior larynx, the trachea, and the skin over these parts."

9. The *dermo-spinalis* [7] is a very delicate muscle in *Strepera*, the Australian Raven, *Gymnorhina*, and the *Cracticus*. It arises in a fascia from the first, second, and third dorsal vertebrae just posterior to the *dermo-cleido dorsalis* (7), and is soon lost to each side over the scapular region.

10. The *dermo-iliacus* [7] arises on each side from the inner angle of the ilium. It runs forward as a narrow, definite, ribbon-like band on the side of the dorsal feather tract, and continues to the upper neck, where it passes directly on to the *dermo-temporalis* (3), and is finally inserted behind the orbit on the skull.

Strepera agrees with the Australian Raven, *Gymnorhina*, and *Cracticus* in this. Shufeldt's account of this muscle in the American Raven agrees generally with that given by Owen in the general account of the "Comparative Anatomy of Vertebrates," vol. ii., p. III. Shufeldt says:—"The fibres pass directly forward, as a narrow ribbon, to spread out as a thin integumental layer to be lost over the region of the shoulder blade." This is quite different from the arrangement described above.

11. The *dermo-ulnaris* [8] arises, in *Strepera*, low down on the third and fourth ribs. It passes directly into the post-pterygium as a wide, fleshy, conspicuous muscle. It soon narrows to a strong tendon, which runs on to join the fascia overlying the end of the ulna about the elbow joint. In the Australian Raven [8a] there is a third tendinous origin on the fifth rib.

12. The *dermo-humeralis* [9] arises as a tough fascia attached to the post-pubic process. It runs in a definite semicircular course past the ventral feather tract, to be inserted by a fan-like tendon into the top of the *pectoralis major* (49). This course is followed in *Strepera*, *Gymnorhina*, the Australian Raven, and *Cracticus*. Furbringer figured a similar arrangement in *Anser*, and called the muscle a part of the *pectoralis major* (*M. pectoralis pars abdominalis*).

The *dermo-humeralis* gives off fibres to the ventral feather tract, and is connected with the *dermo-pectoralis* (13). As the latter joins muscles (3), (6), and (8), the *dermo-humeralis* is thus brought into connection with the other muscles of the dermal system.

13. The *dermo-pectoralis* [10] underlies the ventral feather tract on each side of the breast. Its fibres continue forward to join the fasciculus made up by the *dermo-temporalis* (3), the *dermo-tensor patagii* (6), and the *cleido-trachealis* (8). It also receives fibres from the *dermo-humeralis* (12).

THE MUSCLES OF THE HEAD

(Including the muscles of the lingual apparatus, trachea, and those of the eye and ear).

These have been conveniently grouped by Shufeldt as follows:—

14-20. Muscles of the Head.

21-27. Muscles of the Tongue.

28-36. Muscles of the Air-passages.

37-48. Muscles of the Eye and Ear.

The Muscles of the Head (14-20).

Except in the case of muscle 17, the *entotympanicus*, I find that the muscles of *Strepera* agree with Shufeldt's description of the muscles in the American Raven. The Australian Raven, *Gymnorhina*, and *Cracticus* also agree.

The muscles are—

14. The *temporal*.

15. The *masseter*.

- 16. The *biventer maxillæ*.
- 17. The *entotympanicus*.
- 18. The *pterygoideus internus*.
- 19. The *pterygoideus externus*.
- 20. The *digastric*.

14. The *temporal* [11], [12].—This strong muscle, assisting in closing the jaws, arises fleshy from the temporal fossa which it fills. A few fibres arise from the neighbouring parts of the skull in front, the sphenotic process, and the wall of the orbit. The fibres converge and pass downward and forward to be inserted in the coronoid process upon the upper margin of the mandible. Shufeldt found that the fibres joined those of the *masseter* (15), in the American Raven. Such a union is not conspicuous in the *Strepera*, and is restricted to, at most, but a few fibres.

15. The *masseter* [12] assists the last-named muscle; it has its broad end below and its narrow end uppermost, arises below the *temporal* (14) from the bony ridge above the entrance to the ear, and passes downward and forward, spreading out as it goes. In passing, it makes a tendinous attachment to the upper margin of the lower jaw, and is inserted fleshy about the vacuity in the mandible. A smaller part is inserted tendinously on a small tubercle on the mandible just posterior to the main bulk of the muscles.

16. The *biventer maxillæ* [5], [11], [12], [14a], a mass of muscle, covers the articulation of the jaws posteriorly. It rises from a ridge and a neighbouring depression behind the ear, and is inserted superficially about the end and angle of the lower jaw.

17. The *entotympanicus* [13] is an interesting muscle, small and spindle-shaped. It arises fleshy from the side of the basisphenoid and the rostrum. It passes across, splitting into two—a fleshy division inserted fleshy on the quadrate, and an anterior division becoming tendinous, and inserted on a tubercle near the distal end of the posterior aspect of the pterygoid bone.

18. The *pterygoideus internus* [14] arises on the upper side of the palatine as a fleshy mass on each side. It passes backwards, outwards, and downwards, to be inserted about the angle of the lower jaw. The fleshy mass is tendinous on the inner exposed side.

19. The *pterygoideus externus* [5], [14] crosses the *pterygoideus internus* (18). It arises fleshy from the quadrate bone, runs forward and downward, to be inserted about the vacuity in the mandible on the inner side. It fills the fossa made by the peculiar posterior processes of the palatines in these *Austro-coraces*. Through the vacuity its fibres may be in contact with those of the *masseter*.

20. The *digastric* [5] [12] is a thin semi-transparent muscle, difficult to trace exactly. It arises from the base of the skull, on the basitemporal, about opposite the angle of the lower jaw.

Its fibres run to the middle line, spreading out fan-wise, and meeting the fibres of the corresponding muscle of the other side in a faint raphe. It covers the superior larynx, and is joined by a thin fascia to the *mylo-hyoideus* (21), another superficial muscle. Each passes directly beneath the base of the tongue, and is united to it by fascia; it is also united to the long branch of the hyoid. Shufeldt refers to it as "this extremely attenuated muscular stratum." It is such in *Strepera* also.

The Muscles of the Tongue.

The muscles of the tongue in *Strepera* show very interesting departures from those of the American and Australian Ravens. The Australian Raven agrees with the American Raven as described by Shufeldt. The *Strepera* differs, however, in having two divisions of the *genio-hyoideus* (23) and in the union of the *sterno-hyoideus* (25) with the *cleido-trachealis* (8).

Gadow (Bronn's "Klassen VI. Band," plate xxxii.) has figured the external branch of the *genio-hyoideus* (23) on several birds, including a Cockatoo (*Microglossus aterrimus*), a Bustard (*Otis tarda*), and a Duck (*Fuligula atra*). It is interesting to find this external branch present in *Strepera*, *Gymnorhina*, and *Cracticus*, but absent in the Ravens.

The muscles of the lingual apparatus are numbered and named by Shufeldt as follow:—

21. The *mylo-hyoideus*.
22. The *stylo-hyoideus*.
23. The *genio-hyoideus*.
24. The *cerato-hyoideus*.
25. The *sterno-hyoideus*.
26. The *depressor-glossus*.
27. The *cerato-glossal*.

21. The *mylo-hyoideus* [11], a thin, sheet-like muscle, arises from near the inner upper margin of the mandible. It rises above the *genio-hyoideus* (23) in *Strepera* and the Australian Raven. The latter muscle is pressed close to the inside of the mandible, and the *mylo-hyoideus* is forced to pass over it and then dip down to spread out beneath the tongue. Shufeldt found it arose in the American Raven "just above the lower border and the in-turned edge of the horny sheath of the beak," and figures it as arising close to the inner lower edge of the mandible. He speaks of its "wonderfully delicate fibres." The muscle unites with its fellow in the middle line, and is bound in a fascia about the base of the tongue, though no definite insertion in the hyoid could be found. As already mentioned, this muscle is united by a thin fascia with the *digastric* (20).

22. The *stylo-hyoideus* [14a] arises on the outer side of the posterior end of the mandible. It is a flat, ribbon-like muscle, running downward and forward to be inserted tendinously on the thyro-hyal on the upper surface.

23. The *genio-hyoideus* [14a] [15], as already mentioned, differs in a marked manner in *Strepera* from the same muscle in the Raven. The Australian Raven agrees closely with the American Raven as described by Shufeldt. In *Strepera*, *Gymnorhina*, and *Cracticus*, an external branch arises from the bare part of the outer surface of the mandible just behind the horny sheath. It runs backwards, crosses the lower edge of the mandible, and runs obliquely backward to join the larger branch, where it is wrapped round the thyro-hyal. It undoubtedly assists this muscle in pulling the tongue forward. Professor Gadow figures a similar external branch for a Cockatoo, a Bustard, and a Duck in Bronn's "Klassen VI. Band," plate xxxii.

The main division of this muscle arises, as Shufeldt describes for the American Raven, from the inner side of the mandible nearly as far forward as the horny sheath, and is wrapped round the thyro-hyal as he described. It is bounded internally by the *mylo-hyoideus* (21), which arises above it and passes over it to the middle line.

24. The *cerato-hyoideus* [15] is in *Strepera* as Shufeldt describes it for the American Raven. Arising from the thyro-hyal, it is inserted by a fine, stiff tendon on a bony tubercle on the cerato-hyal. The Australian Raven agrees in the position and course of this muscle, but differs in having a fleshy insertion. *Gymnorhina* and *Cracticus* agree with *Strepera*.

25. The *sterno-hyoideus* [6] [6a] in *Strepera* arises fleshy on each side from the anterior edge of the superior larynx. The two muscles run directly forward to meet at the base and be inserted together into the cerato-hyal. The *cleido-trachealis* (8) on each side, however, instead of being inserted in the cerato-hyal just to the outer and lower side of each *sterno-hyoideus*, as it is in the Australian Raven, joins the corresponding *sterno-hyoideus* in *Strepera*, *Gymnorhina*, and *Cracticus* at about one-third of its length from its origin. Shufeldt found that the *cleido-tracheales* (8) in the American Raven are different. He says the *cleido-tracheales* "are finally inserted, touching each other by their inner borders on the anterior aspect of the superior larynx, the trachea, and the skin over these parts." Shufeldt found that some fibres of the *sterno-hyoideus* (25) were continued into the soft part of the tongue in the American Raven. No fibres going into the soft part of the tongue were observed in any of the birds dissected.

26. The *depressor-glossus* [16] is a short muscle in the middle line on the under side of the tongue. It arises, as Owen and Shufeldt describe, on the under surface of the basihyal. The fibres contract, and become tendinous, to be inserted at the tip of the tongue bone.

27. The *cerato-glossal* [17] is a small muscle arising on the upper surface of the basihyal and running to the thyro-hyal. Owen describes it similarly for the Fieldfare.

Muscles of the Upper Larynx (2) [18].

28. The *constrictor-glottidis*.
29. The *thyreo-arytenoideus*.

Muscles of the Lower Larynx (7) [19].

30. The *tracheo-lateralis*.
31. The *broncho-trachealis posticus*.
32. The *broncho-trachealis anticus*.
33. The *broncho-trachealis brevis*.
34. The *bronchialis posticus*.
35. The *bronchialis anticus*.
36. The *sterno-trachealis*.

These muscles have been so well described by Müller, Owen, Shufeldt, and other writers that they are amongst the best known of bird muscles. As *Strepera* and the other birds dissected agree with the descriptions of Owen and Shufeldt, it is not proposed to describe the muscles in detail. Drawings of the muscles of the *Strepera* have been made from the dissections.

In *Strepera* these muscles of the syrinx are well developed, and are inserted into the ends of the cartilaginous half-rings of the bronchi. *Strepera* is, therefore, placed amongst the Acromyodian birds, or Oscines.

Muscles of the Eye (37-47) [20].

37. The *orbicularis palpebratum*.
38. The *levator palpebræ superioris*.
39. The *depressor palpebræ inferioris*.
40. The *quadratus nictitantis*.
41. The *pyramidalis nictitantis*.
42. The *obliquus superior*.
43. The *obliquus inferior*.
44. The *rectus superior*.
45. The *rectus inferior*.
46. The *rectus externus*.
47. The *rectus internus*.

These muscles agree in *Strepera* exactly with what Shufeldt and Owen have figured in other birds. Drawings have been made from the dissections of the *Strepera*, but it is not proposed to add a full description, when that has already been done by Shufeldt, Owen, and others.

The Muscle of the Ear (1).

48. The *tensor-tympani* [20a].—This muscle, I find, differs in *Strepera* and the Australian Raven from what Shufeldt figures for the American Raven. In *Strepera* it arises fleshy from the inner lower border of the quadrate bone and the neighbouring part of the lower mandible. It runs closely apposed to the quadrate bone, to be inserted on the lower outer edge of the tympanum. Shufeldt found it arose in the American Raven from the "inner end of the quadrato-jugal bone, and the contiguous surface of the quadrate."

THE MUSCLES OF THE UPPER EXTREMITY (45).

These are grouped by Shufeldt as follow :—

I.—The pectoral muscles	..	..	..	3
II.—Dorsal muscles	..	..	..	15
III.—Tensor-patagii muscles	..	..	..	2
IV.—Muscles of the brachium	..	..	..	4
V.—Muscles of the forearm and hand	..	..	..	13
VI.—Muscles of the hand	..	..	..	8
				—
				45

I.—*The Pectoral Muscles.*

49. The *pectoralis major*.
 50. The *pectoralis secundus*.
 51. The *pectoralis tertius*.

These muscles are concerned with the raising and lowering of the wing, and are of great importance to flying birds. *Strepera*, the Australian Raven, *Gymnorhina*, and *Cracticus* agree with Shufeldt's description of these muscles in the American Raven.

49. The *pectoralis major* [9] [23] is the largest muscle in *Strepera*. It arises from the whole under surface of sternum (except the part occupied by the *pectoralis secundus* and *tertius*), the keel, and the posterior aspect of the clavicle. It passes upward and forward, covers the biceps, receives the insertion of the *dermo-humeralis* (12), and is inserted on the outer side of the humerus on a special crest.

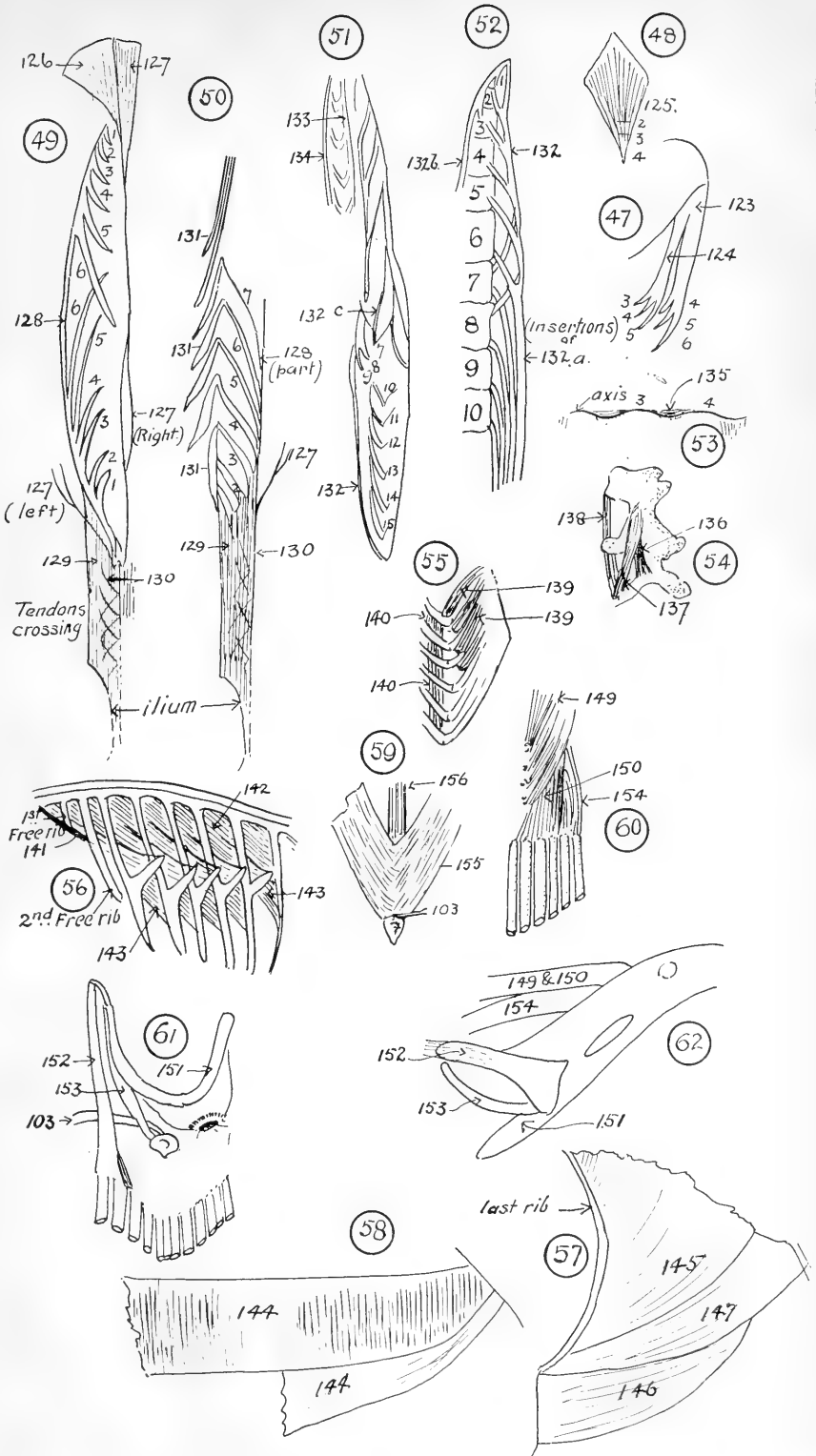
50. The *pectoralis secundus* [21] [22a] arises from the deeper part of the keel and a large part of the sternum between the coracoid and the clavicle. The flattened fibres converge and pass upwards and outwards, becoming a rounded, strong tendon. This passes up through the opening formed by the scapula, coracoid, and clavicle, and, continuing outward and downward, is inserted to the outer side of the radial crest of the humerus, a short distance in front of the insertion of the large breast muscle (49). The *pectoralis secundus* is concerned with raising the wing. Its purpose is achieved by means of this beautiful pulley arrangement, while the centre of gravity is still kept low by having the bulk of the muscle on the ventral side.

51. The *pectoralis tertius* [21] is smaller than the preceding muscle. It arises alongside (50) on the sternum and on the outer side of the coracoid bone. Its fibres converge, and form a strong tendon, which passes up to be inserted on the ulnar crest of the humerus. The contraction of this muscle assists in raising the wing.

II.—*Dorsal Muscles of the Upper Extremity* (15).

Shufeldt numbers and names these as follow :—

52. The *latissimus dorsi*.
 53. The *trapezius*.
 54. The *rhomboides*.





55. The *coraco-humeralis*.
56. The *scapulo-humeralis*.
57. The *supraspinatus*.
58. The *teres et infraspinatus*.
59. The *serratus magnus anticus*.
60. The *subclavius*.
61. The *coraco-brachialis*.
62. The *teres minor*.
63. The *levator scapulæ*.
64. The *thoraco-scapularis*.
65. The *subscapularis*.
66. The *serratus parvus anticus*.

52. The *latissimus dorsi* [22] is a superficial muscle. It is not so well developed in *Strepera*, *Gymnorhina*, and *Cracticus* as in the Australian Raven. Shufeldt found in the American Raven it consisted of two distinct slips, and figures it as extending back in the mid-line as far at least as the line joining the posterior end of the scapula. The Australian Raven agrees with this. *Strepera*, *Gymnorhina*, and *Cracticus*, on the other hand, have a much smaller and narrower muscle, corresponding to the anterior slip of the muscle in the Raven. It arises as a thin fascia from the neural spines of the first and second vertebræ that bear full ribs. The fibres converge, pass under the *deltoid* muscle and the scapula head of the *triceps* muscle to the humerus, to be inserted on the shaft behind the insertion of the *pectoralis major* (49).

53. The *trapezius* [22] is much longer in *Strepera*. It is visible both before and behind the *latissimus dorsi* (52), and not before only, as in the Raven. It passes from the vertebræ to the scapula. Posteriorly, it overlies part of the *rhomboideus* (54). *Gymnorhina* and *Cracticus* agree with *Strepera*.

54. The *rhomboideus* [22] arises from the neural spines of the first four dorsal vertebræ, and runs obliquely outwards to the scapula, as described by Shufeldt.

55. The *coraco-humeralis* [22a], a small muscle, arises, as Shufeldt found in the Raven, from the outer side of the head of the coracoid, near the origin of the *biceps*. In *Strepera* it is fleshy, and runs across to be inserted on the palmar aspect of the humerus, anterior to the insertion of the *pectoralis major* (49).

56. The *scapulo-humeralis* [22a] runs from the neck of the scapula as a narrow, cord-like muscle, to be inserted between the insertion of the *pectoralis secundus* (56) and the *pectoralis major* (49).

57. The *supraspinatus* [22a] [23a] is a flat muscle arising from the scapula and passing directly across to be inserted in the pneumatic fossa of the humerus between the internal and external heads of the *triceps*. The joint tendon of the *teres minor* (62) and *coraco-brachialis* (61) is inserted just posterior to this muscle.

58. The *teres et infraspinatus* [22a] [23a] is a large, flat, triangular muscle arising from the whole length of the scapula behind the

origin of the *infraspinatus* (57). Its fibres converge to be inserted on the ulnar margin of the pneumatic fossa of the humerus between the two branches of the external head of the *triceps*. Shufeldt could divide this muscle on the American Raven into two parts. In *Strepera*, the Australian Raven, *Gymnorhina*, and *Cracticus* this muscle does not show a distinct division into two.

59. The *serratus magnus anticus* agrees with Shufeldt's description of the muscle in the American Raven. It has three digitations, arising from the second, third, and fourth dorsal ribs, and running upwards to be inserted at the end of the scapula.

60. The *sub-clavius* arises from the space between the sternal process and the coracoid, as well as from a fossa beneath the coracoid. It is covered to a large extent by the *pectoralis tertius* (51). The contraction of this muscle causes the coracoid to slide along its bed upon the sternum, and holds the coracoid firmly in position.

61. The *coraco-brachialis* [21] is in *Strepera* a longer muscle than in the Australian Raven. It arises from a small area on a tuberosity near the base of the coracoid and passes directly up parallel with the coracoid, to be inserted on the ulnar tuberosity of the humerus in company with the tendon of the next-mentioned muscle.

In the Australian Raven there is no special tuberosity for the origin of this muscle. It arises in the Raven about level with the anterior insertion of the previous muscle (60). *Gymnorhina* and *Cracticus* agree with *Strepera*.

62. The *teres minor* [21] arises from the anterior part of the scapula. It is a "chunky" little muscle passing under the scapula and behind the coracoid to join the preceding muscle, the *coraco-brachialis* (61). These two muscles assist in the down beat of the wing and in retaining the humerus in its shallow glenoid cavity.

The next four muscles (63-66) are deep muscles concerned with binding the scapula to the body.

63. The *levator-scapulae* are two fleshy muscle bands arising from the lateral processes of the vertebrae with free ribs. They run directly backwards to be inserted in the scapula.

64. The *thoraco-scapularis* is a muscle arising by three digitations from the free rib and the first two dorsal ribs. The fibres converge and pass upwards as a thin flat tendon, dividing the *subscapularis* (65) into two, to be inserted on the lower edge of the scapula.

65. The *subscapularis* is an interesting muscle. It arises on the under side of the scapula as two large flattened sheets, which allow the tendon of the *thoraco-scapularis* (64) to be inserted between them. These sheets converge and pass into a short, strong tendon inserted into the ulnar tuberosity close to the

combined tendon of the *coraco-brachialis* and the *teres minor* (61 and 62).

66. The *serratus parvus anticus* consists of three muscle bands arising from the first free rib and the next two true ribs. These arise above the origins of the *serratus magnus anticus* (59) and the *thoraco-scapularis* (64). The fibres form a flat sheet inserted on the inferior margin of the scapula.

The *levator scapulæ* (63), the *thoraco-scapularis* (64), and the *serratus parvus anticus* (66) are parts of the one system of muscles binding the scapula to the chest.

III.—The Tensor Patagii Muscles (2).

67. The *tensor patagii longus*.

68. The *tensor patagii brevis*.

67. The *tensor patagii longus* [22] arises by a common tendon with (68) from the inner side of the head of the clavicle. The tendon soon becomes fleshy, and forms a thin, spindle-shaped muscle, giving off a very elastic tendon, which runs in the front edge of the patagium. It passes over the end of the radius to the side of the tendon of the *extensor metacarpi radialis longus*. It is attached to the *os radiale* of the wrist and the fascia about the wrist-joint. The tendon, soon after leaving the muscle part, is joined by the tendon from the *dermo-tensor patagii* (6). About a quarter of an inch on the proximal side of the beginning of its tendon the *tensor patagii longus* gives off a tendinous thread over half an inch in length. This is inserted into the anterior lateral face of the *pectoralis major* (49).

68 The *tensor patagii brevis* [22] [24] arises by a common tendon with the *tensor patagii longus* (67) from the head of the clavicle. It soon broadens out into a strong muscle that narrows again and gives off a strong tendon which runs down parallel to the humerus till it meets the *extensor metacarpi radialis longus* (73). Here the tendon bifurcates, and one short part runs directly outwards along the top of that muscle (73), and soon merges with that muscle. The other runs back with, but distinct from, the tendon of the muscle (73), to be inserted just below the external condyle of the humerus. The insertion of the tendon of the muscle itself is on the outer aspect of the tubercle, as Shufeldt found in the American Raven. The *Strepera*, Australian Raven, *Gymnorhina*, and *Cracticus* agree in this. They also agree in a point not mentioned for the American Raven, and that is that the muscle gives off a tendinous loop, which arises a little higher than the tendon and runs in the patagium, to be inserted in the *pectoralis major* (49), as shown in diagram [22]. This loop resembles one figured in a Picarian bird, *Buceros rhinoceros*, by Garrod in the "Proceedings of the Zoological Society of London," 1876, pp. 506-519, plate xix., fig. 2. Garrod, as already remarked, found this muscle of taxonomic value.

IV.—*Muscles of the Brachium* (4).

- 69. The *biceps*.
- 70. The *deltoid*.
- 71. The *triceps*.
- 72. The *brachialis anticus*.

69. The *biceps* [21] [23] is a very large and powerful muscle arising as a flat tendon from the outer part of the head of the coracoid and from the ulnar tuberosity of the humerus. The muscle passes over the *pectoralis major* and forms a big muscular belly. The fibres converge to a strong tendon inserted in the ulna. It is a strong flexor of the forearm.

70. The *deltoid* [22] is distinctly divided into two portions. The first portion is long and narrow, arising from the anterior part of the scapula and neighbouring part of the clavicle. This narrow band runs about half-way down the humerus, where it joins the big muscular part of the *deltoid*, which arises fleshy from the os humero-scapulare and the outer surface of the humerus down nearly the whole length of the shaft, except about the insertion of the *latissimus dorsi* (52). Both parts converge to form a strong subcylindrical tendon, which is inserted into the proximal side of the external condyle of the humerus. This muscle may be of taxonomic value, as it differs in other birds I have examined.

71. The *triceps* [22] [22a] [23] [23a] is divided, as in the Raven, into three portions, one of which, the scapular head, is entirely separated from the rest.

The scapular head arises from the upper side of the scapula just behind the glenoid cavity. It forms a long, thick muscle strand that passes down under the *supraspinatus* (57) and the *teres et infraspinatus* (58) to be inserted as a strong tendon at the proximal end of the ulna.

The internal and external heads of the *triceps* are in close connection except at their proximal ends. They arise on the back of the humerus, allowing the *supraspinatus* (57) to be inserted between them. The external head further divides to allow the *teres et infraspinatus* (58) to be inserted. The two heads soon fuse, and a strong muscle, closely attached to the humerus, runs down to form a broad, flat tendon, which passes across to be inserted into the radial side of the olecranon process of the ulna. The enclosing fascia binds the three parts of the *triceps* together. This muscle is the powerful extensor of the arm.

72. The *brachialis anticus* [23] is a small, narrow muscle passing across from the inner side of the distal extremity of the humerus to the lateral surface of the proximal end of the ulna.

V.—*Muscles of the Forearm and Hand.*

Thirteen muscles are named by Shufeldt, as follow:—

- 73. The *extensor metacarpi radialis longior*.

74. The *extensor digitorum communis*.
75. The *supinator brevis*.
76. The *flexor metacarpi radialis*.
77. The *pronator brevis*.
78. The *pronator longus*.
79. The *extensor ossis metacarpi pollicis*.
80. The *anconeus*.
81. The *extensor indicis longus*.
- 81a. The *flexor digitorum sublimis*.
82. The *flexor digitorum profundus*.
83. The *flexor carpi ulnaris*.
84. The *flexor carpi ulnaris brevior*.

73. The *extensor metacarpi radialis longior*, or *longus* [22] [24], agrees with Shufeldt's description of this muscle in the American Raven. It arises from the humerus, and is inserted by a very strong tendon into the apex of the metacarpus. It receives the tendon of the *tensor patagii brevis* (68), as already described.

74. The *extensor digitorum communis* [24] arises from the humerus just below the external condyle. It forms a long spindle-shaped muscle below the *extensor metacarpi radialis longior* (73), and soon forms a long tendon, which passes in a groove over the distal end of the ulna. It gives off a small branch to the outer side of the base of the pollex. It is continued down a groove on the metacarpus through a pulley provided for it, and is inserted near the front edge of the proximal phalanx of the index finger.

75. The *supinator brevis* lies under the *extensor digitorum communis* (74). It arises from the external condyle of the humerus below the tendon of (74), and passes directly across to be attached to the outer side of the radius for about one-third of its length. It is a feeble muscle in the birds dissected.

76. The *flexor metacarpi radialis* [24] is the large lower muscle of the forearm. It arises by two heads—one, tendinous, from the external condyle of the humerus, and the second, also tendinous, from the ulna beyond the olecranon process. It is closely attached to the bone for a considerable distance. Becoming tendinous, it passes through the fibrous sheath on the outer side of the distal end of the ulna, and goes directly to be inserted on a prominent process on the upper hinder border of the metacarpal.

77. The *pronator brevis* arises tendinous just above the internal condyle of the humerus and passes across to be inserted on the ulnar side of the radius.

78. The *pronator longus* is a more powerful muscle, similar to 77. It arises below the latter from the internal condyle of the humerus, and passes across, under, and behind 77 to be inserted below it on the radius.

79. The *extensor ossis metacarpi pollicis* [24] is an extremely fine thin muscle with a hair-like, glistening tendon. It arises in front of the greater sigmoid cavity of the ulna, and forms a straight,

thin muscle, quite hidden by surrounding muscles. It is soon converted into a hair-like tendon, which passes in close connection with the large tendon of the *extensor metacarpi radialis longior* (73), to be inserted close by it on the palmar side of the first metacarpal. Shufeldt found it "the smallest and most delicate muscle of the forearm" in the American Raven; so it is in *Strepera* and the other birds dissected.

80. The *anconeus* arises by a strong tendon from the external condyle and passes directly to the inner side of the ulna, to be attached for rather more than half its length.

81. The *extensor indicis longus* [25] arises fleshy from more than the inner half of the ulnar side of the radius as an inconspicuous muscle. It gives rise to a narrow tendon of great length that passes down almost to the tip of the hand. It passes over the groove at the distal end of the ulna, directly down the front of the metacarpus and the proximal phalanx of the index finger, to be inserted at the base of the distal phalanx of that finger.

81a. The *flexor digitorum sublimis* is a strong tendinous band with some muscle fibres. It is superficial to the lower muscles of the forearm on the inner side. It runs from the internal condyle of the humerus to the wrist, where it is bound firmly, and then passes on as a tendinous cord to the index finger. Gadow figures it similarly in *Falco tinnunculus*.

82. The *flexor digitorum profundus* [26] arises by two strong fleshy heads from the proximal end of the ulna. The *brachialis anticus* and *biceps* are inserted between these two heads. The fibres from these heads soon merge, and the common muscle is attached to the ulna for a short distance. The long tendon passes through the fibrous loops on the wrist. It runs to the front upper edge of the end of the metacarpal along the anterior upper edge of the proximal phalanx of the index finger, joins a fibrous sheath, and is inserted into the ulnar side of the base of the distal phalanx of this finger.

83. The *flexor carpi ulnaris* [26] in *Strepera* differs from the American Raven as described by Shufeldt. Shufeldt describes this muscle as arising in the American Raven by "two strong tendons which merge into a strong fusiform muscle occupying rather more than the posterior half of the under side of the forearm. From the anterior apex of this muscle a powerful and subcylindrical tendon stretches directly to the back of the ulnare ossicle of the carpus, where it makes an extensive attachment. Just before reaching this ossicle the tendon of the *flexor carpi ulnaris* differentiates off a small tendinous slip, which, passing through a fibrous loop at the ulnar side of the carpus, goes obliquely downwards to the tendon of the *flexor digitorum profundus* and merges with it."

In *Strepera* the two parts are distinct. They arise as Shufeldt described for the American Raven. The tendon of the lower part

passes through the humero-ulnar pulley, forms the fleshy mass of the under side of the arm, becomes a very strong tendon, and is inserted directly into the ulnare ossicle. The upper part arises as a strong tendon from the internal condyle of the humerus outside the humero-ulnar pulley, and, becoming fleshy, runs parallel to, and closely bound with, but (except for a tendinous connection) remaining distinct from the main part of the muscle. Its fine tendon runs on above the strong tendon of the main part and behaves as Shufeldt stated for the branch that he described as arising from the main tendon before it was inserted on the ulnare ossicle. The tendon of the upper part runs on in a sheath above that of the lower part; it passes above the ulnare ossicle and across the metacarpal to join the tendon of the *flexor digitorum profundus* (82).

Gymnorhina, *Cracticus*, and the Australian Raven agree with *Strepera* in having the upper part (except for the tendinous connection) distinct from the lower part.

A superficial fascia with muscle fibres about the elbow arises from near the tendon of the lower part of this muscle. A branch is given off to each secondary, as figured by Gadow on plate xx.a, fig. 1, of the work before mentioned.

84. The *flexor carpi ulnaris brevior* [26] agrees in *Strepera* with the same muscle in the American Raven as described by Shufeldt. It arises beneath (82) from the middle third of the upper side of the ulna, becomes tendinous, and runs directly above the tendon of (82) to the carpus. Its tendon winds round in front of the radiale bone to be inserted upon the outer edge of the top of the *carpo-metacarpus*.

VI.—The Muscles of the Hand.

Shufeldt names these as follow :—

85. The *extensor proprius pollicis*.
86. The *flexor brevis pollicis*.
87. The *flexor minimi digiti*.
88. The *flexor minimi digiti brevis*.
89. The *abductor minimi digiti*.
90. The *flexor metacarpi brevis*.
91. The *interosseous dorsalis*.
92. The *interosseous palmaris*.

In *Strepera* these muscles agree closely with Shufeldt's careful description of them as they occur in the Raven.

85. The *extensor proprius pollicis* [28] is a neat muscle, well suited for extending the thumb. It arises from the ulnar side of the tendon of the *extensor metacarpi radialis longior* (73), becomes tendinous, and is inserted into the antero-ulnar side of the pollex.

86. The *flexor brevis pollicis* [28] arises fleshy from the side of the metacarpal, becomes tendinous, and is inserted into the apex of the pollex.

87. The *flexor minimi digiti* [28] arises fleshy from the posterior side of the upper end of the metacarpal, and is joined by a distinct branch from the ulna. It runs down a groove provided for it, and the delicate tendon is inserted into the base of the phalanx of the medius finger.

88. The *flexor minimi digiti brevis* [28], a fleshy, rudimentary muscle, arises from the distal posterior aspect of the metacarpal, becomes tendinous, and is inserted at the apex of the phalanx of the medius.

89. The *abductor minimi digiti* [28] is a small rudimentary muscle—indeed, almost a ligamentous band. It arises from the anterior proximal aspect of the medius digit, passes outwards, and is inserted upon the posterior edge of the proximal phalanx of the index finger.

90. The *flexor metacarpi brevis* [27] arises partly fleshy and partly tendinous from the outer side of the distal extremity of the ulna in the superficial fascia to which the primary wing quills are bound. The fleshy part soon ceases, and the delicate superficial tendon runs obliquely down the *carpo-metacarpus* to be inserted at the base of the proximal phalanx of the index finger on its ulnar side in front. This is not an easy muscle to dissect. The tendon runs so superficially that there is danger of removing it when the primaries are freed from the hand, to which they are so firmly lashed.

91. The *interosseous dorsalis* [27] is the outer and higher of two flat paper-like muscles that are found in the long vacuity in the index and medius metacarpal, as described by Shufeldt for the Raven. It sends a slender tendon in a shallow groove to be inserted at a point on the anterior aspect of the base of the distal phalanx of the index digit.

92. The *interosseous palmaris* [27] lies in the same vacuity under and more distally than the *interosseous dorsalis* (91). Its tendon passes more posteriorly to the outer side of the index digit even to the apex of that digit.

THE MUSCLES OF THE LOWER EXTREMITY.

Shufeldt named 30 muscles in the lower extremity of the Raven. I find in *Strepera* and the Australian Raven one additional muscle, the *gluteus quartus* of Mayer, quoted by Owen. Shufeldt named the thigh muscles as follows:—

93. The *sartorius*.
94. The *gluteus primus*.
95. The *gluteus medius*.
96. The *gluteus minimus*.
97. The *extensor femoris* (*cruræus*, *vastus externus*).
98. The *vastus internus*.
99. The *biceps flexor cruris*.
100. The *semitendinosus*.

- 101. The *accessory semitendinosus*.
- 102. The *semimembranosus*.
- 103. The *femoro-caudal*.
- 104. The *obturator externus*.
- 105. The *obturator internus*.
- 106. The *gemellus*.
- 107. The *adductor longus*.
- 108. The *adductor magnus*.

93. The *sartorius* [22] [29] [31], the most anterior of the superficial fleshy muscles of the thigh, arises from the anterior border of the ilium and by a thin fascia from the neural spine of the fourth dorsal vertebra. In *Strepera* it passes downward, becomes more fleshy, passes round the patella, and is inserted in a semitendinous fascia about the summit of the tibia. Shufeldt finds, in the American Raven, that the *sartorius* is inserted into the patella as well as about the tibia. It is not inserted into the patella in *Strepera* and the Australian Raven.

94. The *gluteus primus* [29] is extremely thin. In the central part it is, indeed, but a tendinous fascia. It covers the edge of the *sartorius* (93) in front. It arises from nearly the whole length of the supero-internal margin of the ilium. In front of the acetabulum the origin is a thin fascia; behind it is fleshy. The fibres converge towards the patella. They join with the *extensor femoris* (97), and form a tendinous coating for the knee. The patella is formed in this "aponeurotic ligament," which is inserted in the cnemial crest of the tibia. The central part of this extensive muscle is almost entirely fascia-like, so that it might almost be considered as consisting of two muscles.

95. The *gluteus medius* [29] [32], a thick, fleshy muscle, arises from the entire supero-internal margin of the front part of the ilium. It fills the concavity and passes back as a strong tendon, to be inserted on the proximal extremity of the femur.

96. The *gluteus minimus* [32] is almost hidden by (95). It is a small muscle running from the anterior edge of the outer side of the ilium and the last rib. It forms a tendon which is inserted into the outer aspect of the upper third of the femur.

96a. The *gluteus quartus* [32] of Professor Mayer, quoted by Owen ("Vert. Anat.," vol. ii., p. 100), is present in *Strepera*, the Australian Raven, *Gymnorhina*, and *Cracticus*. It is a very small muscle, arising, as Owen states, fleshy from the outer edge of the ilium, posterior to the origin of the *gluteus minimus* (96). Its fibres run parallel with those of that muscle and become tendinous. The tendon winds up on to the outer face of the femur, to be inserted into the trochanter immediately below the insertion of the *gluteus medius* (95). The *gluteus quartus* is quite hidden by the *gluteus medius*.

97. The *extensor femoris* [31] [32] is a powerful muscle consisting of two well-marked parts—viz., the *vastus externus* and the

cruræus. The *vastus externus* arises on the femur at the base of the trochanter, and by fleshy fibres right down the shaft of the bone almost to the condyle.

The *cruræus* is bulky, and arises by a tendon from the anterior aspect of the trochanter, and by fibres down the shaft of the femur. These two muscles and the *gluteus primus* (94) merge and form the "aponeurotic ligament" already referred to as being spread over the knee, and inserted in the cnemial crest of the tibia.

The ambiens muscle is absent in the birds under notice, so that these birds are "anomalognathous," as all Passerine birds are.

98. The *vastus internus* [31] is a distinct muscle on the inner side of the leg. It arises on the inner side of the femur just below the head, and is attached down the bone in a straight line, spreading out to be inserted along the inner border of the summit of the tibia just above the insertion of the *sartorius* (93).

99. The *biceps flexor cruris* [29] [32] [33] arises broadly by a tendinous fascia from the post-acetabular ridge. It is flat and triangular, and rapidly converges to form a round, cord-like tendon, which passes through a tendinous loop from the lower part of the femur and is inserted into a tuberosity on the back of the fibula, some little distance down that bone. The effectiveness of the muscles is greatly added to by the tendinous loop. The weight is distributed, and a more rapid and more complete inflection of the leg is secured by its means.

100. The *semitendinosus* [29], a broad, flat muscle, arises from the hinder part of the post-acetabular ridge and by a thin fascia from the caudal muscles beneath. It passes obliquely downwards to meet the *accessory semitendinosus* (101) at a tendinous raphe which merges behind with the inner head of the *gastrocnemius* muscle (109). *Strepera* and the other birds agree exactly with the American Raven as described by Shufeldt in this muscle.

101. The *accessory semitendinosus* [29] is a flat, board-like muscle arising from the back of the distal end of the femur. It passes directly upward and backward to meet the *semitendinosus* (100) in the tendinous raphe previously mentioned.

102. The *semimembranosus* [30] [36], a long, flat, ribbon-like muscle, arises from the outer surface of the ischium. It passes downward and forward, and becomes a delicate wide tendon that is inserted into the tibial shaft.

103. The *femoro-caudal* [30] [59] [61], one of the muscles used in the famous attempts of Garrod to classify birds by the presence or absence of certain leg muscles, is an interesting muscle, and agrees, in *Strepera*, with what Shufeldt has described for the American Raven. It arises tendinous from the pygostyle, and passes forward first as a rounded tendon. It becomes a flat muscle, and converges to a flat tendon, to be inserted on the

outer side of the femur, about one-third of its length down the shaft of that bone.

The *accessory femoro-caudal*, another of Garrod's muscles, is absent in the Raven and the birds under notice. He used five muscles. These were:—

The *ambiens*.

The *femoro-caudal* (denoted by A).

The *accessory femoro-caudal* (denoted by B).

The *semitendinosus* (denoted by X).

The *accessory semitendinosus* (denoted by Y).

The first and third are absent in the birds under discussion. Their muscular formula on Garrod's system is A X Y—that is, the *femoro-caudal*, the *semitendinosus*, and the *accessory semitendinosus* are present, as they are in the Piciformes and the Passeriformes, except the Drongo (*Dicruridae*), which has the muscle formula A X.

104. The *obturator externus* [30] is a thick, fleshy muscle arising from the lower posterior half of the ilium. It runs forward as a fleshy mass, becomes tendinous, and is inserted on the femur below the trochanter and above the insertion of the *femoro-caudal* (103). This muscle is bent down to provide for the passage of the sciatic nerve and artery above it.

105. The *obturator internus* [30] in *Strepera* agrees with Shufeldt's description of the muscle in the Raven. It arises internally from the ventral surface of the ischium. It has a central tendon, to which the fibres converge. The strong tendon passes up through the obturator foramen to be inserted overlying the *gemellus*, into the outer aspect of the trochanter of the femur.

106. The *gemellus* [30] is a fleshy, thick muscle between the back of the femur and the pelvis. It arises on the outer side of the pelvis, and passes directly with the tendon of the *obturator internus* (105), to be inserted on the trochanter of the femur.

107. The *adductor longus* [30], a flat, board-like muscle, arises from the lateral aspect of the pelvis below the *obturator externus* (104). It passes downward and forward to be inserted down the back of the femur, from above the insertion of the *femoro-caudal* (103) down to the internal condyle. It is closely related to the next muscle, the *adductor magnus* (108).

108. The *adductor magnus* [30] is longer and more slender in *Strepera* than is (107). It arises below the ischiatic fossa on the outer lateral edge of the pelvis. Its fibres pass to be inserted into the internal condyle of the femur. The internal head of the *gastrocnemius* is attached to this muscle above its insertion. It is also bound in a fascia with the *adductor longus* (107).

THE MUSCLES OF THE LEG AND FOOT.

These are named by Shufeldt—

109. The *gastrocnemius*.

110. The *soleus*.

- III. The *peroneus longus*.
- II2. The *tibialis anticus*.
- II3. The *extensor longus digitorum*.
- II4. The *extensor hallucis brevis*.
- II5. The *tibialis posticus*.
- II6. The *flexor perforatus indicis secundus pedis*.
- II7. The *flexor longus hallucis*.
- II8. The *flexor perforatus annularis primus pedis*.
- II9. The *flexor perforatus medius primus pedis*.
- II0. The *flexor perforatus medius secundus pedis*.
- II1. The *flexor perforatus indicis primus pedis*.
- II2. The *flexor perforans digitorum profundus*.

109. The *gastrocnemius* [33] is a very large muscle ensheathing most of the middle leg: *Strepera* agrees with the American Raven as described by Shufeldt. This muscle is made up of three large divisions. The first, the external head, arises on the outer condyle of the femur by a short, strong tendon. It then becomes a spindle-shaped muscle merging into a tendinous expansion about two-thirds of the way down the tibia. The internal head arises from the outer surface of the inner condyle of the femur; it is broad and fleshy. The distal end of the *adductor magnus* (108) makes a tendinous connection with it close to its origin. Its fibres run down the back of the leg, and merge into the tendinous expansion of the external head. The tibial head has a broad fleshy origin from the summit of the tibia and the edge of the procnemial crest, and is the largest of the three divisions. Its fibres converge low down, become tendinous, and join the tendinous expansion previously mentioned. The common broad tendon develops a flattened cartilaginous plate that rides over the true tibial cartilage. The tendon passes on and merges into the strong fascia that binds about the tarso-metatarsus.

110. The *soleus* [36] is under the tibial head of the *gastrocnemius* (109). It arises in the cnemial crest, and is overlain below its origin by the insertion of the *semimembranosus* (102). It soon converges and becomes tendinous, sending down a long, thin tendon to the proximal end of the tibial cartilage.

111. The *peroneus longus* [34] is a very large muscle which covers the front of the leg. It arises from the cnemial crest, and the fascia that covers the knee-joint. The fibres, very tendinous on the inner side, fit closely round the leg, run down to and become a small tendon. This bifurcates and gives one short branch to the upper part of the tibial cartilage. The smaller branch goes to the outer side of the tarso-metatarsus, and joins the tendon of the *flexor perforatus medius primus pedis* (119). Thus, the *peroneus longus* assists in flexing the toes in *Strepera* as in the Raven.

112. The *tibialis anticus* [35] arises as two distinct heads—the larger on the front of the tibia up between the cnemial crests, the second from a depression in the ridge of the outer condyle of

the femur. The two parts pass down as a large muscle, and converge about two-thirds of the way down into a strong tendon. This passes through the oblique "fibro-cartilaginous bridge" above the condyles of the tibia to be inserted on a special tubercle on the tarso-metatarsus.

113. The *extensor longus digitorum* [37] [37a] arises fleshy from the cnemial crest and from a small part of the tibia under the larger part of the last muscle (112). Its fibres pass down on the inner front side of the tibia as a long slender muscle. It gives rise to a strong tendon, which passes under the fibro-cartilaginous loop mentioned under the *tibialis anticus* (112) and a bony bridge in front of the tarso-metatarsus. It passes down to the trochleæ of the basal toe-joints, where it divides into three tendons. So far, *Strepera* agrees with the American Raven as described by Shufeldt, but it differs considerably from Shufeldt's description of the insertions of the tendons of the toes. Shufeldt says:—"These slips pass respectively over the superior aspects of the second, third, and fourth toes, bifurcating as they do so beyond the basal joints, to be inserted at the base of the distal ones. At the proximal extremity of each series of phalanges the tendons are bound down in the median grooves intended for their passage and guidance by a strong, fibrinous, fascia-like sheath."

In *Strepera* I find the arrangement on the medius toe is quite different from that on the index and the annularis toes. Shufeldt describes each as being the same in the American Raven. On the medius toe [37a] the tendon divides into three, the inner branch runs along the top inner border of the phalanges to be inserted in the fascia at the base of the unguis phalanx. The second division runs only to a fascia ensheathing the proximal end of the second phalanx. The third division almost immediately divides into two, the inner of which goes on to be inserted at the proximal end of the third phalanx, the other runs over the outer upper margin of the second and third phalanges to be inserted at the base of the unguis phalanx. The Australian Raven, *Gymnorhina*, and *Cracticus* agree.

On the index toe the tendon bifurcates at about two-thirds of the length of the basal phalanx. The first slip is inserted in the mid-line into the proximal end of the second phalanx; the second slip runs on to join a fascia at the proximal end of the third or unguis phalanx.

The fourth (annularis) toe has five phalanges. The tendon runs past the distal phalanx, and about half-way along the second phalanx it bifurcates. One slip is inserted at the proximal end of the third phalanx, the other slip runs on, bifurcating about the middle of the fourth phalanx into two equal branches, which are inserted on each upper lateral margin of the unguis (fifth) phalanx. There is no insertion on the basal, second, or fourth phalanx. *Strepera*, the Australian Raven, *Gymnorhina*, and *Cracticus* agree in the insertions of these tendons.

114. The *extensor hallucis brevis* [38] is a small but very interesting muscle. *Strepera* agrees with the American Raven as described by Shufeldt for this muscle, which arises fleshy from the front of the inner head of the tarso-metatarsus, and from the neighbouring fascia about the tendons, especially that of the *tibialis anticus*. The delicate fibres pass down in a shallow groove along the shaft of the bone. They give rise to a strong tendon which passes round the accessory metatarsal and along the outer side of the basal joint of the hallux to be inserted into the base of the ungual phalanx.

115. The *tibialis posticus* [39] arises from the fibula below the insertion of the *biceps flexor cruris* (99) from the adjacent parts of the tibia. Some of its fibres blend with the *flexor perforans digitorum pedis* (116), which partly overlies its anterior upper part. It forms a strong tendon, which is inserted into the outer, upper edge of the tarso-metatarsal bone.

116. The *flexor perforatus indicis secundus pedis* [40] [43] [45] is a small spindle-shaped muscle arising from the external condyle of the humerus. Its fibres blend with those of the anterior border of the *tibialis posticus* (115), and soon form a tendon which passes through the tibial cartilage and the hypotarsus down the back of the tarso-metatarsus and under the annular ligament of the foot. It here forms a sheath for the perforating tendon, and bifurcates into two slips about the middle of the second phalanx of the index toe. Each slip of tendon is inserted into the lower side about the middle of the second phalanx.

117. The *flexor longus hallucis* [41] [46] arises tendinous by two heads. The first arises from the under surface of the femur and the second from the external condyle. The fibres soon unite, and pass down the back of the leg, narrowing to form a strong tendon. This tendon passes through the tibial cartilage and the hypotarsus to the inner side of the leg, and runs down the back of the tarso-metatarsus, superficial to the tendon of the *flexor perforans digitorum profundus* (122), to the apex of the accessory metatarsal bone. It winds round to the inner side of it, and runs in a groove to be inserted on a tubercle on the base of the ungual phalanx of the hallux. This is one of the plantar tendons made so famous by Garrod. This is more fully set out after the description of muscle 122.

118. The *flexor perforatus annularis primus pedis* [41] [43] has a long name, but, as it is given according to Shufeldt's effective system, it is self-explanatory. It is the muscle whose tendon is perforated on the fourth toe (corresponding to the ring finger), and is inserted into the first phalanx of that toe. This muscle in *Strepera* arises tendinous from the under side of the humerus, and runs down closely applied to the last muscle (117). The fibres flatten out, and then converge to form a tendon which runs through the tibial cartilage and the hypotarsus with the tendon

of the next muscle (119). The tendons of these two muscles now separate; that of the present muscle runs to the outer toe, and forms a tubular sheath for the passage of the perforating tendon of the deep flexor (122). It sends down two short slips, one to be inserted on each side near the distal end of the basal phalanx. It again runs on and finally bifurcates into two slips, one being inserted into each side of the base of the second phalanx. Thus it serves as two perforated tendons inserted into two phalanges of the fourth toe.

119. The *flexor perforatus medius primus pedis* [41] [43] [44] is the flexor muscle that is perforated by the deep flexor (122) on the medius (third toe), and is inserted on the basal phalanx of that toe. It arises fleshy from the beginning of the fleshy part of the *flexor perforatus annularis primus pedis* (118), and becomes converted into a flattened tendon. This runs, in company with the tendon of muscle 118, through the tibial cartilage and the hypotarsus down to the under side of the toes. The tendon forms a sheath for the deep flexor (122) and bifurcates. Each slip is inserted on either side about the middle of the basal phalanx of the medius toe.

120. The *flexor perforatus medius secundus pedis* [42] [43] [44] is the flexor muscle whose tendon is perforated on the medius toe, and is inserted into the second phalanx of the toe. The muscle arises from the external condyle of the humerus, from the fascia about the knee, and from the tibia, the fibula, and neighbouring muscles. It is a large fusiform muscle, forming a strong, flat tendon. This passes through the tibial cartilage and the hypotarsus to the under part of the third toe (medius). It perforates the tendon of the basal phalanx (119), and forms a sheath to be perforated by the tendon of the deep flexor (122). It then bifurcates, and is inserted into either side of the second phalanx of the medius toe.

121. The *flexor perforatus indicis primus pedis* [42] [43] [45] is the flexor that is perforated by the tendon of the deep flexor on the index toe, and is inserted on the basal phalanx. It arises just posterior to the *flexor perforatus medius secundus pedis* (120) from the external condyle of the femur by a thin tendon. It becomes fleshy, but soon narrows and becomes converted into a strong tendon. This passes through the tibial cartilage and the hypotarsus. It passes to the second toe, and, after forming a sheath for the passage of the deep flexor (122), it bifurcates, and the slips are inserted into either side of the basal phalanx of the index toe.

122. The *flexor perforans digitorum profundus* [43] [44] [45] [46] agrees with this muscle, as described by Shufeldt, in the Raven. It arises from the hinder part of the external condyle of the femur, from the upper part of the posterior aspect of the tibia, and from the posterior face of the shaft of that bone. It tapers directly downward into a strong tendon, which passes through

the tibial cartilage and through the hypotarsus near the inner side. It runs directly down the back of the tarso-metatarsus, between the bone and the tendon of the *flexor longus hallucis* (47). In this part the tendon develops a flattened bony rod. At the lower end of the tarsus the tendon trifurcates, forming three strong tendons, which run one to each toe. Each runs in a deep groove on the under side of the toe to be inserted into a tubercle at the base of the unguis phalanx. Each tendon passes through or perforates the tendon of muscles inserted on the more proximal phalanges of the toes.

The branch on the index toe perforates the tendons of the *flexor perforatus indicis secundus pedis* (116) and the *flexor perforatus indicis primus pedis* (121)—that is, the tendon of muscle 116 wraps round or ensheathes the tendon of 122 for some distance and then bifurcates into two slips, one of which is inserted on either side of the second phalanx of the index. The tendon of 121 is wrapped round both 116 and 122 for a short distance. It bifurcates, and the slips are inserted, one into either side of the basal phalanx. Both 116 and 122 perforate 121, while 116 is perforated by 122. Similarly, on the medius toe 122 perforates 119 and 120, while on the annularis toe 122 perforates 118, which, however, after ensheathing 122 and bifurcating, and having two slips inserted into either side of the basal phalanx, runs on (still ensheathing 122) to bifurcate again and be inserted on either side of the third phalanx. As the three branches of the tendon of the *flexor perforans digitorum profundus* (122) perforate other tendons, the word "*perforans*" is part of the name of this muscle. The arrangement of the tendons of these flexor muscles is of much taxonomic value. In the birds under examination the tendon of the *flexor perforans digitorum profundus* (122) passes through the hypotarsus to the outer side. It then passes down the middle line, becomes flattened and ossified, passing under the tendon of the *flexor longus hallucis* (117), but without being joined by a vinculum or loop to that muscle. This relation holds in all Passerine and some Picarian birds. Professor Sundevall and Professor Garrod found these deep plantar tendons of much value as a guide to classification.

THE MUSCULATURE OF THE TRUNK.

The muscles of the freely movable neck are well developed: on the other hand, the muscles of the rigidly supported back region are poorly developed. Twelve muscles were described by Shufeldt for the American Raven. The *Strepera* and other birds under notice agree closely in the size and arrangement of these muscles.

The careful descriptions and full details given by Shufeldt render comparison of the *Strepera* with the Raven a comparatively simple task, though the dissection of the neck muscle is by no means an easy one. The neck muscles have been named by Shufeldt as follows:—

- 123. The *complexus*.
- 124. The *rectus capitis anticus minor*.
- 125. The *flexor capitis inferior*.
- 126. The *rectus capitis posticus major*.
- 127. The *biventer cervicus*.
- 128. The *longus colli posticus*.
- 129. The *sacro-lumbalis*.
- 130. The *longissimus dorsi*.
- 131. The *obliquus colli*.
- 132. The *longus colli anterior*.
- 133. The *rectus capitis lateralis*.
- 134. The *trachelo-mastoideus*.
- 135. The *interspinales*.
- 136. The *interarticulares*.
- 137. The *obliquo-transversales*.
- 138. The *intertransversales*.

123. The *complexus* [47] in *Strepera* is, as Shufeldt described for the Raven, a well-developed muscle arising from the sixth, fifth, and fourth vertebræ. The fibres soon unite and run forward as a flat, ribbon-like muscle, to be united with the corresponding muscle by fascia and inserted into the skull a short distance above the occipital ridge.

124. The *rectus capitis anticus minor* [47] is closely connected by fascia with the last muscle (123). It arises from the hypapophyses of the second, third, and fourth vertebræ, and runs forward bound to the anterior side of the *complexus* (123) to be inserted on the same line of the skull.

125. The *flexor capitis inferior* [48] is a massive muscle in the mid-line. It might almost be regarded, as Shufeldt pointed out, as an "azygos" muscle, so closely are the two muscles blended. It arises in common with 124 from the hypapophyses of the second, third, and fourth cervical vertebræ. It passes forward on the base of the skull to be inserted into the basitemporal. The branches of the one carotid artery can be seen posterior to this muscle mass.

126. The *rectus capitis posterior major* [49] arises from the neural spine of the second vertebra. Its fibres spread out to be inserted, almost touching their fellow of the opposite side on the back of the skull.

127. The *biventer cervicus* [49] [50] is a remarkable muscle on each side. It arises from the neural spine of the first and second thoracic vertebræ and the adjacent muscular and tendinous network. It passes forward along the upper surface of the neck, becomes tendinous at the groove on the upper side of the neck; again becoming fleshy and flat, it runs forward to the head, and is inserted into the occiput under the insertion of the *complexus* (123), and over that of the *rectus capitis posticus major* (126).

128. The *longus colli posticus* [49] [50] is a complicated but very

interesting muscle. It extends for the whole length of the neck, has many origins and many insertions. It arises directly from the muscles along the vertebræ of the back, and also as a glistening fine tendon from the neural spine of the first and second thoracic vertebræ. It joins the *longissimus dorsi* (130) by a fleshy muscle, and gives off six distinct slips, which increase in length up the neck, as shown in the figure. These slips insert into the postzygapophyses of successive vertebræ, and also join the *obliquus colli* muscles (131), which are inserted into the same structures [50]. Six other ribbon-like slips run forward to join the main body of 128. The most posterior arises from the neural spine of the seventh vertebra. The other five arise similarly from the neural spine of successive vertebræ and join the same narrow muscle band to run forward to be inserted into the transverse process of the axis vertebra.

129. The *sacro-lumbalis* [49] [50] is closely blended with the next muscle, the *longissimus dorsi* (130). It is the outer part of a mass that rises along the sides of the vertebræ and on the ribs. It arises from the anterior end of the ilium, from the space between the ilia, and from the transverse processes of the dorsal vertebræ. It makes insertions to the first dorsal and free ribs, and is inserted into the diapophysis of the twelfth cervical vertebra.

130. The *longissimus dorsi* [49] [50] is between the last muscle (129) and the neural crest of the dorsal vertebræ. It is a mass traversed by numerous tendons making attachments with ribs and vertebræ. It arises as far back as possible in the angle between the ilia and from the neural crest of the vertebræ, as Shufeldt described for the American Raven. This muscle in *Strepera* forms Xs of tendon on to the neural crests of the vertebræ. It continues to make attachments and receive fibres as it goes on to the base of the neck. It has four insertions on the eleventh, twelfth, thirteenth, and fourteenth vertebræ respectively. The last one resembles the first of the series of seven fasciculi which make up the *obliquus colli* (131). It is also continuous with the *longus colli posticus* (128).

131. The *obliquus colli* [50] is made up of a series of seven fasciculi of muscle on the side of the neck. The first links up, as Shufeldt described in the Raven, the *longus colli posticus* (128), the *longissimus dorsi* (130), and the *sacro-lumbalis* (129). The first arises from the diapophysis of the eleventh vertebra, crosses over the tenth, and is inserted into the postzygapophysis of the ninth. It is joined by the third down branch from the *longus colli posticus* (128), as shown in the diagram. The next oblique section arises from the tenth vertebra, passes over the ninth, and is inserted into the eighth. It receives the fourth branch from muscle 128. The third, fourth, and fifth oblique sections arise similarly, are inserted similarly, and are united with muscle 128 similarly. The sixth oblique section arises from the sixth

vertebra, joins the fourth vertebra in similar way to those already described, but also passes on to be again attached to the third vertebra. The last section acts in a manner similar to that of the first five. It arises from the fifth vertebra and is inserted into the third. Muscles 128, 129, 130, and 131 are closely related. They constitute, Shufeldt says, "one of the most complicated systems of muscles that I have any knowledge of."

132. The *longus colli anterior* [51] [52] forms a somewhat similar complicated structure on the ventral surface. The arrangement in *Strepera* agrees with that of the Raven, as described by Shufeldt. He divided this muscle into three parts—a vertical portion, a superior oblique, and an inferior oblique portion. The vertical portion is the largest. It arises from the hypapophyses of the tenth to fifteenth vertebræ inclusive, runs forward along the neck, to be inserted touching its fellow on the inferior tubercle of the atlas. This division, like the *longus colli posticus* muscle (128), gives off a system of tendons becoming longer anteriorly. These are attached to the parapophyses of the vertebræ from the tenth to the fourth inclusive. At its anterior end the muscle gives off tendons to the hypapophyses of the fourth, third, and second vertebræ. It also gives off "accessory fasciculi" down to and including the eighth vertebra. Each arises from the pleurapophysis of a vertebra, and runs up to join the tendon of the *longus colli anterior*, which is inserted into the parapophysis of the vertebra next beyond. The superior oblique section of the muscle arises separately from the diapophyses of the fifth, fourth, and third vertebræ. Its fibres run forward, become tendinous, insert into the tubercle of the atlas on the outer side of the insertion of the main portion of the muscle. The inferior oblique portion arises, in *Strepera*, from the transverse processes of the seventh and sixth vertebræ, passes upwards, and is inserted by a very delicate tendon into the parapophysis of the third vertebra.

133. The *rectus capitis lateralis* [51] arises from the diapophyses of the fifth, fourth, and third cervical vertebræ. It passes obliquely upwards to form a strong tendon which is inserted into the inner tubercle on the basal ridge of the basitemporal.

134. The *trachelo-mastoideus* [51] is a well-developed, flattened muscle external to and overlapping the last muscle, the *rectus capitis lateralis* (133). It arises on the outer side of the last muscle from the diapophyses of the fifth, fourth, third, and second vertebræ. It converges, becomes tendinous, and is inserted into the outer tubercle of the basal ridge of the basitemporal.

135. The *interspinales* [53] form a series of small muscles connecting the neural spines of the vertebræ except in the dorsal region. They are best developed between the anterior and posterior cervical vertebræ.

136. The *interarticulars* [54], as Shufeldt described, extend from the postzygapophysis of one vertebra to that of the next.

137. The *obliquo-transversales* [54] are narrow muscles passing obliquely from the transverse process of a cervical vertebra, past the next vertebra, to the postzygapophysis of the vertebra next beyond.

138. The *intertransversales* [54] form two sets—(a) short, thick muscles extending between the transverse processes of cervical vertebrae, commencing between the third and fourth vertebrae; (b) muscles joining the parapophyses of successive cervical vertebrae.

139. The *triangularis sterni* [55] is an interesting muscle situated inside the thorax. It arises from the costal process of the sternum, spreads out over the costal ribs, and runs up in four digitations to be inserted one on each of the first four ribs. The first branch is very distinct, and would almost rank as a separate muscle.

140. The *intercostales* [55] are small muscles developed between the ribs. The first is the most conspicuous. It arises from the front edge of the first dorsal rib and runs obliquely forward to the last free rib.

141. The *scalenus medius* [56] is really the first of the *levator costarum* muscles. It arises from the diapophysis and adjacent parts of the eleventh cervical vertebra. The fibres attach firmly to the end of the short free rib, and run on to be inserted into the anterior margin of the long free rib at about the middle third.

142. The *levator costarum* [56] is a series following the *scalenus medius*. Each arises from the transverse process of a vertebra from the twelfth backward, runs obliquely downward to be inserted in the anterior face of the rib next beyond. They become more feeble posteriorly.

143. The *appendico-costales* [56] form a neat set of muscles running from the under side of the epipleural process of the rib to be inserted into the anterior edge of the rib next behind. A strong triangular membrane supports each epipleural appendage by uniting it to the rib in front of it. These are strongest in front, and decrease backwards.

144. The *obliquus externus abdominis* [58] is described by Shufeldt as the most external muscle of the abdomen. It is a very large, thin muscle layer. It arises from the dorsal ribs about the level of the base of the epipleural appendages, from the pelvis, the post-pubic element of the pelvis, and from the structures about the tail. The membrane soon develops muscle fibres; it is attached to the ribs, passes over the sternal ribs, and is attached to the *pectoralis major* [49] and to the hinder border of the sternum. Some fibres run longitudinally backwards from the sternum to the post-pubic element of the pelvis.

145. The *obliquus internus abdominis* [57] lies under the last-mentioned muscle. It arises tendinous, as Shufeldt describes for

the Raven, from the post-pubic process and the neighbouring parts of the pelvis. It passes forward to be inserted into the posterior edge of the last rib. Its mesial border is free.

146. The *rectus abdominis* [57] arises by a tendinous membrane from the post-pubic element of the pelvis, and from the ligament that joins the two post-pubic processes. It agrees with Shufeldt's description of the muscle in the Raven. At first it is tendinous, and becomes muscular at a definite line. It runs to the sternum, and is attached, but is continued as a thin membrane to be attached to the outer side of the ribs under the other abdominal muscles which have been described.

147. The *transversales abdominis* [57] is a definite muscle, well developed in *Strepera*, as it is in the Raven. It arises from the ligament between the post pubes and the under side of the pelvis. It becomes fleshy, runs forward over the peritoneum to be inserted over the inner side of the ribs. Ventrally, it is inserted into the *linea alba*.

148. The *diaphragm*.—Shufeldt describes three rudimentary muscles in association with the diaphragm of the Raven. Though I specially dissected two specimens of each of the Raven, *Gymnorhina*, and *Strepera*, I did not succeed in satisfying myself that these rudimentary muscles were present.

The remaining muscles are concerned with the movement of the tail.

149. The *levator coccygis* [60] and (150), the *levator caudæ* of Shufeldt, are not distinct in *Strepera*, the Australian Raven, *Gymnorhina*, or *Cracticus*, though Shufeldt found them to be distinct, though closely related, and connected with fascia, in the American Raven. Shufeldt regards the *levator coccygis* as the detached portion of the *longissimus dorsi* (130), which in most reptiles is continuous to the tail. It arises from the posterior aspect of the pelvis and the caudal vertebræ. It is inserted, in *Strepera*, into the tuberosity on the anterior margin of the pygostyle and also into each neural spine of the caudal vertebræ; further, it is inserted fleshy over the four inner tail quills on each side. Gadow, in Bronn's "Klassen der Their-Reichs," vi., Band, figures this muscle mass as "one."

151. The *transversus perinor* [62] is a flat sheet of muscle arising from the lower edge of the ischium and the post-pubic process. It forms a loop for the passage of the *femoro-caudal* muscle (103), and runs down to meet its fellow of the under side just before the anus. Gadow figures two muscles connected with the anus—a circular band about the anus and the sphincter muscle in the margin. These are present in *Strepera* and the other birds examined.

152. The *depressor-caudæ* [61] [62] arises from the posterior border of the ischium and the post pubis, as Shufeldt described for the Raven. The fibres converge, and are inserted into the base of the three outer rectrices.

153. The *depressor-coccygis* [61] [62] arises from the posterior edge of the ischium and post-pubic element of the pelvis. Its fibres converge and form a narrow muscle, which is inserted into the lower portion of the pygostyle.

154. The *lateralis caudæ* [60] [62] has, as Shufeldt described, four fasciculi, the outer being most distinct. It arises from the transverse process of the first caudal vertebra and is inserted on the outer side of the outer rectrix. The other fasciculi arise from succeeding caudal vertebræ and are inserted into the under side of the quill butts of the three outer rectrices.

155. The *lateralis coccygis* [59] arises from the posterior end of the ilium and the caudal vertebræ. It runs down to blend with its fellow over the ventral surface of the pygostyle in a white glistening fascia. It is attached to the under surface of the pygostyle, except the midspine.

156. The *infracoccygis* [59] arises from the diapophysis of the last sacral vertebra and also from the caudal vertebræ. It merges with its fellow, and runs backward, converging to be inserted into the midspine of the pygostyle.

THE PTERYLOSIS OF STREPERA (Plate III.)

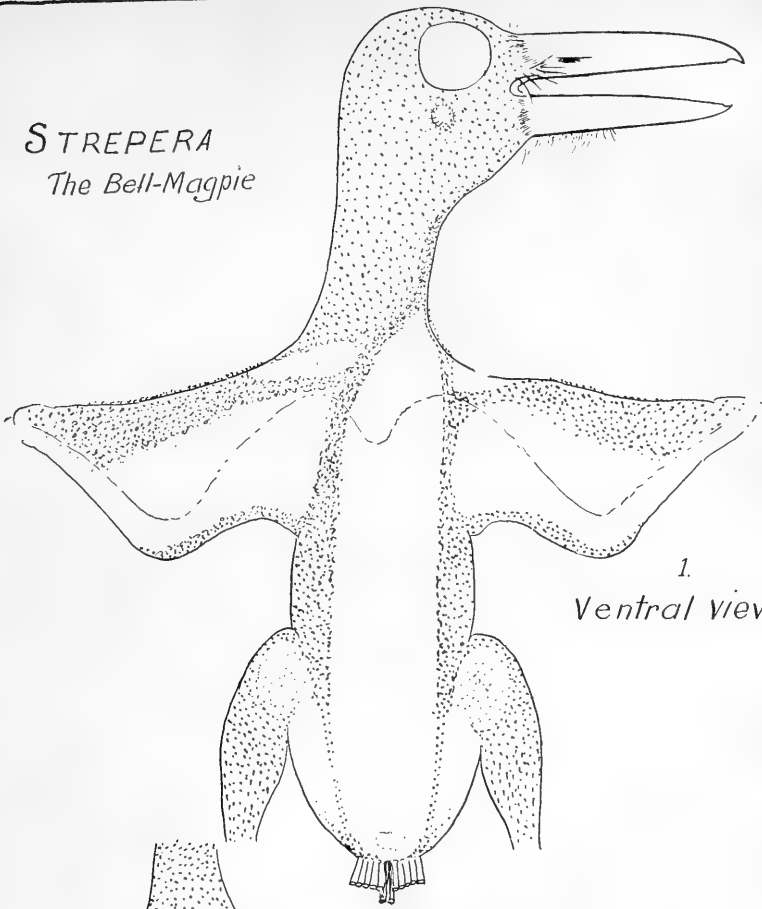
The pterylosis or arrangement of the feathers on a bird was first studied by Nitzsch, whose important work on "Pterylography," edited by Burmeister, was published in 1833, after the death of the author. Fortunately, the Ray Society in 1867 published a translation of Nitzsch's "Pterylography," edited by Dr. Sclater. *Strepera*, *Gymnorhina*, and *Cracticus* agree closely in the feather tracts; *Corvus* differs in having an apterium, or space without feathers, in the centre of the dorsal feather tract. This is an important difference. The primaries are ten in each case; the tenth or outermost is the shortest. There are eleven secondaries, and the eleventh or innermost is very short in each genus. The fifth cubital or secondary is present in all the birds examined, so that these birds have a quincubital wing.

The fifth cubital is present in Passeres, *Colius*, Humming-Birds, and Nightjars. It is variable in Kingfishers and Swifts, and is absent in many widely-separated groups, including, amongst others, *Anseres*, *Herodii*, *Columbidæ*, *Accipitres*, *Psittaci*, and *Striges*.

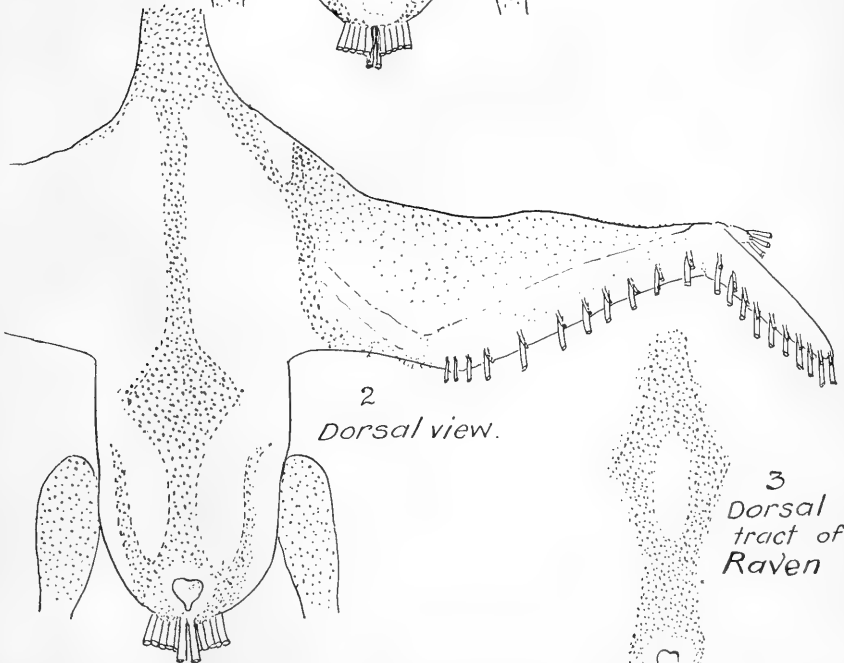
Goodchild ("Proceedings Zoological Society," 1886, pp. 184-203) has found the arrangement of the wing coverts uniform in the chief groups.

The wing coverts are arranged in the usual Passerine manner in these birds. The greater coverts of the secondaries do not exceed half the length of the corresponding secondary, and they overlap with the proximal edge covered by the feather next inside it. The median coverts have the distal edges overlapped by the feather in front of each. Passerine birds and Woodpeckers have this arrangement. The tenth primary is considerably

STREPERA
The Bell-Magpie

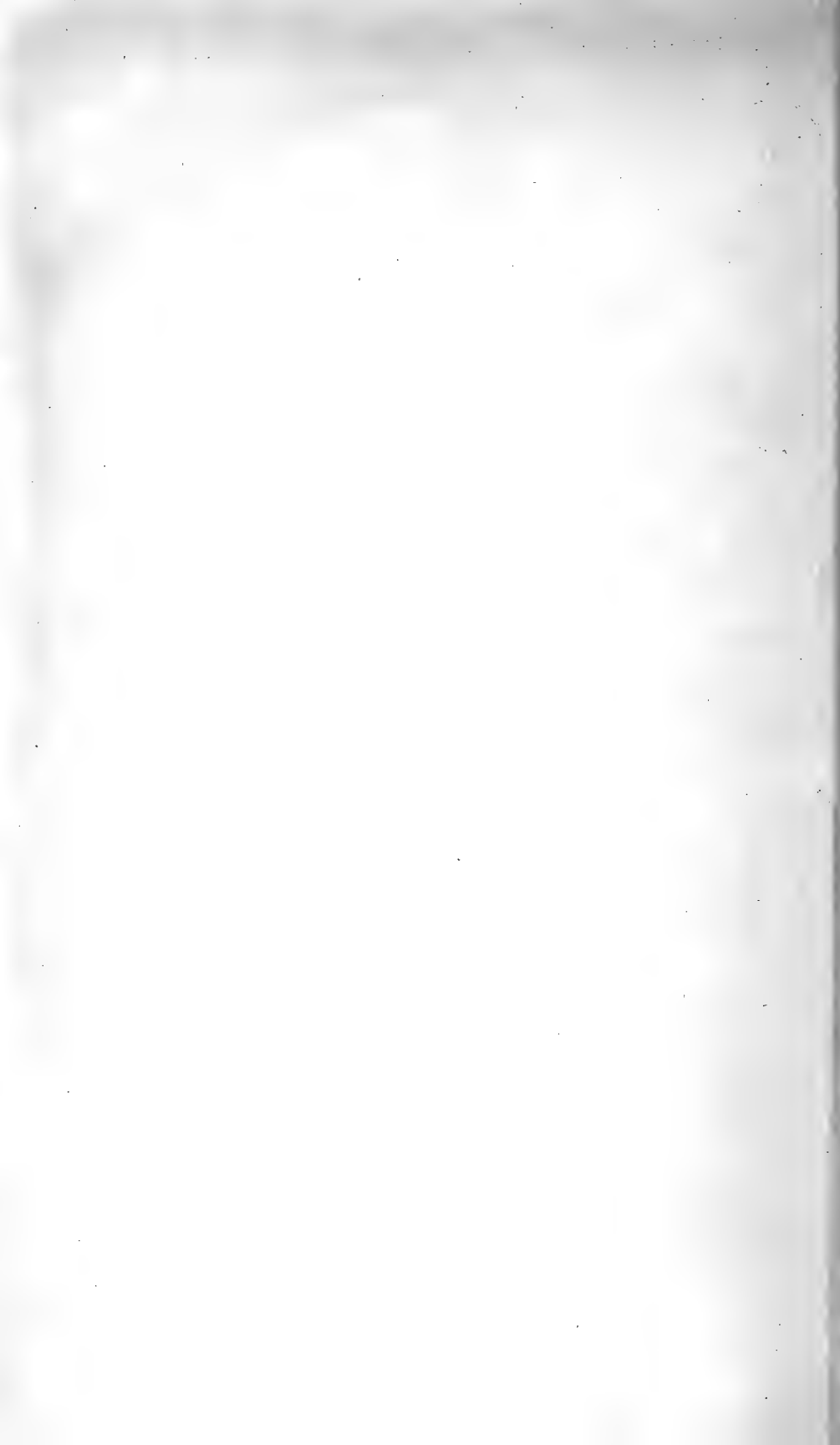


1.
Ventral view.



2
Dorsal view.

3
Dorsal tract of Raven



reduced, being less than half the length of the longest primary; the ninth quill is always less than the eighth.

The pterylosis indicates that *Strepera* is related to *Gymnorhina* and *Cracticus*, and not to *Corvus*.

There are six pairs of rectrices or tail quills. The centre pair is placed higher, one feather on each side of the pygostyle close to the bone. The other five pairs have upper tail coverts. Coverts are absent from the centre pair.

Gymnorhina has dense, closely webbed and hooked contour feathers.

Cracticus has looser plumage, while *Strepera* has the feathers still more loosely webbed and hooked.

The oil-gland has no tuft of short feathers.

The young birds are faintly mottled and marked on their plumage, and are not similar to the adult in *Cracticus* and *Gymnorhina*. Not enough material is at hand for a satisfactory examination of the phases of *Strepera*, though I examined the specimens in the National Museum, Melbourne.

The young of *Corvus* are like the adults, but are duller.

THE CONVOLUTIONS OF INTESTINES AND CÆCA.

The convolutions of the intestines agree closely in all the birds examined, whether they are examined by tracing the coils as set out by Gadow ("Proceedings Zoological Society," 1889, pp. 303-316) or by opening out the folds and spreading the sheet bounded by mesentery out flat, as described by Mitchell ("Transactions Linnean Society," second series, vol. viii.: Zool., pp. 173-275).

Strepera has a bend in the last ascending branch which is absent in the other birds examined.

The quotients obtained by dividing the actual length of the intestine from the pyloric to the anus by the distance from the first thoracic vertebra to the anus are as follow:—

<i>Strepera</i>	..	$26\frac{3}{4}$ "	
		<hr/>	= 6.48
		$4\frac{1}{8}$	
Raven ..	..	$29\frac{1}{2}$ "	
		<hr/>	= 5.36
		$5\frac{1}{2}$	
<i>Cracticus</i>	..	$11\frac{1}{4}$ "	
		<hr/>	= 3.91
		$2\frac{7}{8}$	
<i>Gymnorhina</i>	..	$14\frac{3}{4}$ "	
		<hr/>	= 3.68
		4	

The cæca vary in length. In

Raven	they are	$\frac{5}{8}$ " long.
<i>Strepera</i>	"	$\frac{1}{2}$ " long.
<i>Gymnorhina</i>	"	$3/16$ " long.
<i>Cracticus</i>	"	$3/32$ " long.

THE PALATE.

The palate, as in all members of the Passeriformes, is ægithognathous—that is, the vomer is truncated and the maxillo-palatines do not fuse. The palate of *Strepera*, however, is not the usual ægithognathous type, but is the “compound ægithognathous” form of Professor W. K. Parker, who, in the “Transactions of the Zoological Society,” ix., 1877, p. 327, described the palate of *Gymnorhina* as being very different from that of the normal *Corvus* type.

Gymnorhina and *Cracticus* show a fuller development of this modification than *Strepera* does. In *Gymnorhina* the vomer is forked, the nasal septum and the walls of the olfactory chamber are ossified, and the palate is converted into a desmognathous palate. It, however, is not the usual desmognathous palate formed by the fusion of the maxillo-palatines with the septum. *Gymnorhina* and *Cracticus* have the olfactory chamber so strongly ossified that the foramen is almost filled, but in *Strepera* the ossification has not proceeded so far. The vomer is much modified. In *Gymnorhina* and *Cracticus* it is strongly forked in front. In *Strepera* the forking is seen only on the upper surface. The pterygoids are fused with the palatines in *Gymnorhina*, *Strepera*, and *Cracticus*, not hinged as they are in *Corvus*. Huxley made use of the characters of the palate in classification. His famous paper marked a distinct advance in the classification of birds (“Proceedings Zoological Society,” 1867).

THE CAROTID ARTERY.

The carotid artery in *Strepera* is single; it is the left carotid found in the Passeres and many other birds, the right carotid being absent. It runs forward partly in a special canal formed on the ventral side of the middle cervical vertebræ, and divides into two at the base of the skull, thus serving as two carotids.

STERNUM AND RIBS.

The sternum in *Strepera* has a large single notch in the posterior border on each side. It has also a large Y-shaped external spine on the anterior upper border. These two features are characteristic of the Passerine sternum.

Pycraft records an epipleural appendage on the posterior rib, and says the ribs are very broad and strong. Possibly his specimen was abnormal. The specimens examined by me of *Strepera*, *Gymnorhina*, and *Cracticus* had the epipleural appendage smaller and shorter on the next to last rib, and the last rib had no appendage. The ribs were not noticeably broad or strong, as Pycraft found in his specimens of *Gymnorhina*.

THE POSITION OF STREPERA IN CLASSIFICATION.

Dr. Stejneger says, in “The Riverside Natural History,” vol. iv.: The Birds, p. 458:—“There seems to be no single

character by which the Passeres can be separated from all the rest of the birds." They, however, possess certain characters which are not combined in the same way in a bird of any other order. These characters are referred to in the following summary :—

In *Strepera* the *ambiens* muscle of the thigh is absent. This bird, therefore, belongs to Garrod's sub-class *Anomalogonatae* (abnormally-kneed). Its muscle formula is A X Y, denoting that the *femoro-caudal*, the *semitendinosus*, and the *accessory semitendinosus* muscles are present. The anomalogonatous birds include the Passeriformes and the Piciformes. *Strepera* has short cæca on the intestine and has a nude oil-gland. These characters exclude it from the Piciformes, and leave it in the Passeriformes.

The second, third, and fourth toes are directed forwards, and the well-developed hallux is directed backwards. The *flexor longus hallucis* tendon is superficial to, and not united with, the tendon of the *flexor perforans digitorum*.

These characters confirm the inclusion of *Strepera* in the Passeriformes.

The intrinsic muscles of the syrinx are attached to the ends of the cartilaginous half-rings of the bronchi. *Strepera*, therefore, belongs to the Acromyodian section of the Passeriformes.

The tendon of the *tensor patagii brevis* muscle of the arm joins the *extensor metacarpi radialis longior* muscle, but does not fuse with the tendon of that muscle. It runs just external to it, to be inserted immediately below the insertion of the *extensor metacarpi radialis longior*. *Strepera* is, therefore, a member of the *Passeres Normales*. *Atrichia*, the remarkable Australian Scrub-Bird (two species), is the only Acromyodian genus in which the tendon of the *tensor patagii brevis* differs in its insertion from that of *Strepera*. In *Atrichia* the tendon fuses with the tendon of the *extensor metacarpi radialis longior*. *Atrichia* is thus accorded the honour of Sub-division I., *Passeres Abnormales*.

Sharpe has, in the catalogue of Passeriformes or Perching Birds in the British Museum, vol. iii. (1877), subdivided the *Passeres Normales* into "sections," and again into "groups," which are made up of families. In his "Hand-list of Birds," however, he did not provide for "sections" or "groups," but divided the *Passeres Normales* into 48 families. Oates, in his notes on Passeres in "The Fauna of British India: Birds," vol. i., p. 6, said :— "No success has attended the efforts of anatomists to subdivide the Acromyodi into two or more groups by internal characters."

We are concerned with three only of the forty-eight families of Sharpe's "Hand-list of Birds." They are :— Family 17, *Laniidæ*; family 47, *Corvidæ*; and family 48, *Streperidæ*. These are shown as follows in "The Hand-list of Birds," Order XXXVI., vol. iii., 1901 :—

PASSERIFORMES.

Sub-Order I. : *Mesomyodi.*Sub-Order II. : *Acromyodi.*(A) *Passeres Abnormales*, 1 family.*Atrichornithidæ* : Scrub-Birds, 2 species.(B) *Passeres Normales*, 48 families.Family XVII. : *Laniidæ* (vol. iv., 1903).Sub-Family I. : *Gymnorhinæ.*1. *Pityriasis.*2. *Gymnorhina.*3. *Cracticus.*4. *Strepera.*Family XLVII. : *Corvidæ* (vol. v., 1909).Family XLVIII. : *Streperidæ* (vol. v., 1909).1. *Strepera.*

The palate of *Strepera* is not the typical ægithognathous form, but a desmognathous type which has been developed by the ossification of the nasal sac and septum, as already explained. It has also a long process backward from the outer end of the palatines. These characters place *Strepera* in the Gymnorhines of Pycraft with *Gymnorhina* and *Cracticus*, and away from the *Corvidæ*. The presence of the external branch of the *genio-hyoideus* muscles, of the single anterior branch in the *latissimus dorsi* muscles, and the insertion of the *cleido-tracheales* muscles into the *sterno-hyoideus* muscles in *Strepera*, *Gymnorhina*, and *Cracticus* further justify the grouping of these birds, and their separation from *Corvus*.

The pterylosis of *Strepera* agrees with that of *Gymnorhina* and *Cracticus*. It differs from that of *Corvus* in having no apterium in the dorsal feather tract. This is an added reason for the combining of *Strepera*, *Gymnorhina*, and *Cracticus*, and their separation from *Corvus*.

This investigation supports Ridgway in his belief that *Strepera* certainly does not belong to the *Corvidæ*, and that "a more consistent view of their relationship would entitle them (*Strepera* and *Cracticus*) to the rank of a family, *Streperidæ*." Sharpe's action in placing *Strepera* in the family *Streperidæ* was fully justified. The results of the examination show that *Gymnorhina* and *Cracticus* must also be included in that family.

Treasurer's Note.—The hon. treasurer desires to remind members that subscriptions, being payable in advance, are again due, and he will be glad to receive them for the current year, together with arrears, if any.

Northern Territory Birds.

BY H. G. BARNARD.

FOLLOWING is a list of birds observed during a collecting trip on the M'Arthur River, N.T., undertaken on behalf of Mr. H. L. White, of Belltrees, Scone, New South Wales.

The sub-specific name according to Mr. Gregory Mathews's new "List of the Birds of Australia" follows the name according to the R.A.O.U. Check-list:—

Dromalus novæ-hollandiæ (*Dromiceius novæhollandiæ woodwardi*).—A few birds were seen in scrubby localities. The blacks brought a pair of eggs to the police station at Borroloola in June, 1913.

Synoiacus australis (*S. ypsilophorus cervinus*).—A common bird about swampy localities. A female containing a fully-developed egg was shot in May, 1913, and a set of seven eggs was taken in January, 1914.

Turnix castanota (*Austrotornix castanota castanota*).—These birds were fairly common on the spinifex ridges and about the sandstone bluffs.

Myristicivora spilorrhœa (*M. bicolor spilorrhœa*).—The first arrivals were seen on the M'Arthur on 10th October. They were afterwards fairly common, and bred on the tops of the bunches of mistletoe growing on the swamp gums along the river.

Geopelia humeralis (*Chrysauchæna h. apsleyi*).—A common bird, and one that bred freely in the shrubs and casuarinas growing along the river.

Geopelia tranquilla (*G. placida placida*).—This bird was common in all localities, and bred in the scrubby timber.

Geopelia cuneata (*Stictopelia c. mungi*).—Found in brush and among the sandstone and spinifex ridges, where they were breeding.

Phaps chalcoptera (*P. c. consobrina*).—They were common in the brush and among the tea-tree, where they were breeding.

Histiophaps histrionica (*H. h. alisteri*).—These birds were scarce, and only a few were seen coming to water late in the evening.

Geophaps smithi (*Terraphaps s. smithii*).—Great numbers watered at a spring close to the camp during the long, dry summer. Eggs were taken in May, 1913.

Lophophaps plumifera (*L. p. plumifera*).—Fairly common west of Borroloola, in the high sandstone country.

Hypotaenidia philippensis (*H. p. yorki*).—Only a single bird was seen; she was flushed from her nest and shot while on the wing.

Poliolimnas leucophrys (*P. cinereus leucophrys*).—These birds came with the rains in January, 1914, and commenced to build in the rushes in small swamps. No eggs had been laid, however, when we left the locality in February.

Tribonyx ventralis (*Microtribonyx v. territorii*).—A few birds were seen at some small water-holes filled by storms in December, 1913.

Porphyrion melanonotus (*P. m. neomelanotus*).—Only a few birds were seen, in the rushes growing along the river.

Podiceps gularis (*Tachybaptus ruficollis parryi*).—Seen on the swamps filled by the rains in the end of December, 1913. A nest containing a pair of eggs was found in a swamp in January, 1914. The eggs were left for additions, but on visiting the spot a few days later the nest was empty.

Lobivanellus personatus (*Lobibyx miles personata*).—Only a few birds were seen on the M'Arthur, but they bred freely during February and March of 1913 on the Barclay Table-land.

Ochthodromus veredus.—These birds appeared in small flocks on the flats about Borroloola in November, 1913, and were still about when we left the locality in February, 1914.

Ægialitis nigrifrons (*Euseya melanops russata*).—A few birds were seen about the swamps.

Himantopus leucocephalus (*H. l. assimilis*).—Seen about the reaches of the river before the rains, but they disappeared afterwards.

Glottis nebularius (*G. n. glottoides*).—Only odd birds were seen about swamps.

Parra gallinacea (*Irediparra g. rothschildi*).—Seen on the lily leaves growing in fresh-water lagoons.

Glareola grallarla (*Stiltia isabella*).—A few birds seen on the flats about Borroloola.

Edicnemus grallarius (*Burhinus magnirostris rufescens*).—Generally seen about stony localities; their wailing cry was often heard at night.

Choriotis (Eupodotis) australis (*Austrotis a. derbyi*).—A few birds were seen on the flats about Borroloola, but they were very plentiful at the head of the river towards the table-land.

Antigone australasiana (*Mathewsia rubicunda argentea*).—Generally seen in pairs about swamps and marshy localities.

Ibis molucca (*Threskiornis m. strictipennis*).—A few were seen along the river and about swamps.

Carphibis spinicollis.—A few small flocks were seen on the flats:

Platalea regia.—Seen along the river and about swamps.

Platibis flavipes.—A few were seen along the river.

Xenorhynchus asiaticus (*X. a. australis*).—Seen singly and in pairs along the river and at swamps.

Herodias syrmatophorus (timoriensis) (*H. alba syrmatophora*).—Seen along the river and about swampy localities.

Notophox novæ-hollandiæ.—Plentiful along the river and about swamps.

Notophox pacifica.—Only a few birds were seen at swamps.

Notophox flavirostris (*Tonophox aruensis flavirostris*).—Only one pair seen, at a swamp on the M'Arthur River.

Nycticorax caledonicus (*N. c. australasica*).—Very plentiful, roosting in the timber along the river and creeks during the day.

Dupetor gouldi (*Dupetor flavicollis olivei*) (?).—Seen along the rivers and creeks, and found breeding in tea-tree swamps in January, 1914. Skins were sent, but they have not yet been identified.

Anseranas melanoleuca.—Seen on fresh-water lagoons,

- Nettapus pulchellus.**—Very common on lagoons and swamps.
- Dendrocygna eytoni.**—Seen about swamps.
- Anas superciliosa** (*A. s. rogersi*).—A few seen on swamps.
- Nettion gibberifrons.**—Fairly common on the lily lagoons.
- Spatula rhynchotis.**—Seen on a large lagoon south of the M'Arthur River.
- Nyroca australis.**—Fairly plentiful on the lagoons, though waterfowl of all kinds were scarce about the M'Arthur River.
- Phalacrocorax carbo** (*P. c. novæhollandiæ*).—A few birds seen along the river.
- Phalacrocorax melanoleucus.**—Seen along the river and about swamps.
- Plotus novæ-hollandiæ.**—Seen along the river.
- Pelecanus conspicillatus** (*Catoptropelicanus c. westralis*).—Seen on lagoons; uncommon.
- Circus assimilis.**—A few birds seen flying low over the grassy flats. A nest was found in May, 1913, with three eggs just hatching.
- Astur approximans.** (*Urospiza fasciata didima*).—Fairly plentiful along the river, where they were found breeding.
- Accipiter torquatus** (*A. cirrocephalus broomei*).—They were breeding at Batten's Creek and the M'Arthur Station, but were not seen about Borroloola.
- Erythroriorchis radiatus.**—Only a few of these fine birds were seen. A nest found early in September contained one hard-set egg. A second nest, with two fresh eggs, was found a few days later, and under this nest lay the remains of a Nankeen Night-Heron. On visiting the nest exactly four weeks later, two fine eggs, evidently laid by the same pair of birds, were taken. While I was taking the eggs the male bird brought a Naked-eyed Partridge-Pigeon (*Geophaps smithi*) with which to feed his mate.
- Uroaetus audax** (*U. a. carteri*).—Fairly common. A nest found in June, 1913, contained two eggs; another, found in August, contained two very young birds.
- Hieraetus morphnoides.**—A nest found on 6th June, 1913, contained a pair of fresh eggs; other nests were found in August and September.
- Haliæetus leucogaster.**—Seen along the river from M'Arthur Station to the coast. A nest found early in May, 1913, contained two young birds.
- Haliastur leucosternus** (*Haliastur indus leucosternus*).—Seen along the river.
- Haliastur sphenurus.**—Very common; they were breeding all along the river.
- Milvus affinis** (*M. horschun affinis*).—Fairly common about the M'Arthur till July, when they left for the table-land, where they breed freely.
- Lophoëtinia isura.**—A few birds were seen till July, but none was seen afterwards.

Gypoietinia melanosternon (*G. melanosterna decepta*).—A fair number of these fine birds was seen. Generally they were hawking over the tree-tops. When on the wing they are easily distinguished from other Hawks by the white patch on the wing and the black breast. They were breeding in September, 1913.

Elanus axillaris (*E. a. parryi*).—Only a few birds were seen. A nest containing three young birds was found in May, 1913.

Falco hypoleucos.—Only one pair of these beautiful Falcons was seen; one of these was shot.

Falco subniger.—Only a few of these birds were seen; they were always in pairs.

Falco lunulatus (*F. longipennis apsleyi*).—Fairly common; found breeding in the tall *Melaleuca* trees growing along the river. A set of three eggs was taken from a nest in September, and, a month later, a second set of three eggs was taken from the same nest.

Hieracidea berigora (*Ieracidea b. melvillensis*).—These birds were very numerous, and a number of nests was found. From skins of both old and young birds forwarded to Mr. H. L. White, and compared with skins in his collection obtained from various parts of Australia, together with my observations of these birds in Eastern and Western Queensland, I am of the opinion that we have only one Brown Hawk, and not two, as has always been stated. I know that in making this statement I am pitting my opinions against those of eminent men, but I venture to state that no one could separate the Eastern and Western forms without having localities to go on. My contentions are that the variations are merely those of changes of plumage.

Cerchneis cenchroides (*C. c. milligani*).—Rather uncommon on the M'Arthur River.

Ninox boobook (*Spiloglaux b. mixta*).—These birds were fairly numerous, and a number of nests was found; most of these contained young.

Ninox occidentalis (*Hieracoglaux connivens occidentalis*).—These birds were found roosting in the brush during the day. In the nesting season the female remains in the nesting hollow during the day, while the male roosts in the branches of a neighbouring tree. He often attracts attention by uttering a low growl as a person passes. The female can be flushed from the hollow by hitting the butt of the tree with a tomahawk.

Ninox rufa.—A pair of birds which I think were referable to this species was flushed from some brush near the river. One was shot, but fell in the river, which at this part was infested with crocodiles, so that it was unsafe to venture into the water.

Strix delicatula (*Tyto alba delicatula*).—These birds were fairly often flushed from hollows in trees, but only in one instance was a nest found.

Strix novæ-hollandiæ (*Tyto n. melvillensis*).—Uncommon. An immature bird shot contained the hind legs and tail of a large rat in its stomach.

Egotheles novæ-hollandiæ (*A. cristata leucogaster*).—Frequently flushed from hollow spouts. Eggs were taken in October, 1913, and January, 1914.

Eurystomus pacificus (*E. orientalis bravi*).—First seen on 15th October. Evidently these were the first arrivals from New Guinea, but in a few days they were plentiful. They commenced breeding in December.

Alcyon pulchra (*A. azurea pulchra*).—Fairly common along the rivers and creeks.

Dacelo cervina (*D. leachii cervina*).—Common right to the table-land watershed; they bred freely in November and December.

Halcyon pyrrhopygius (*Cyanalcyon p. obscurus*).—Fairly common, and very noisy during the breeding season. The nest is a tunnel in the bank of a creek or a hollow spout of a tree.

Halcyon sanctus (*Sauropatis sancta ramsayi*).—Fairly common along the river-flats. They were breeding in tunnels in termites' nests in trees and in hollow spouts.

Merops ornatus (*Cosmærops o. shortridgei*).—Very plentiful. They remained all the winter, and do not appear to migrate.

Eurostopodus guttatus (*E. argus harterti*).—These birds were plentiful about the sandstone ranges, where they were found breeding.

Chætura caudacuta.—Observed flying low over the trees after rain.

Cuculus pallidus (*Heteroscenes p. occidentalis*).—These birds were first seen on 14th November, and were never numerous.

Cacomantis variolosus (*C. pyrophanus dumetorum*).—Were very numerous, and their mournful whistle was often heard. Eggs of this species were taken from nests of the following birds:—*Amytornis woodwardi*, *Malurus coronatus* (*Rosina c. macgillivrayi*), *Glyciphila fasciata* (*Ramsayornis f. fasciatus*), *Conopophila rufogularis* (*C. r. queenslandica*), *Rhipidura albiscapa* (*R. flabellifera buehneri*), and *Rhipidura tricolor* (*Leucocirca t. picata*).

Mesocallius osculans.—Fairly common in the brush along the river.

Chaleococcyx basalis (*Neochalcites b. modesta*).—Only seen about low sandstone ridges. Eggs were taken from nests of *Malurus cruentatus* (*Ryania melanocephala cruentata*), and *Malurus dulcis* (*Leggeornis amabilis dulcis*).

Chaleococcyx minutillus (*Lamprococcyx m. minutillus*).—Only a few birds noticed. An egg was found in the nest of *Gerygone olivacea flavigaster*?

Eudynamis cyanocephala (*E. orientalis subcyanocephalus*).—These birds first arrived on 28th October, 1913, and soon were very plentiful. Their loud whistling call was frequently heard, both day and night. Eggs were taken from nests of *Philemon sordidus* (*Microphilemon orientalis sordidus*) and *Grallina picata* (*G. cyanoleuca neglecta*).

Scythrops novæ-hollandiæ (*S. n. neglectus*).—A few birds were seen and heard after the rains in December and January.

Centropus phasianus (*Polophilus p. macrourus*).—Plentiful in the long grass and shrubs along the river and creeks. One nest, built in the top of a pandanus palm, about 20 feet from the ground, contained five eggs.

Petrochelidon ariel (*Lagenoplastes a. conigravi*).—Plentiful about the high sandstone ranges, and numbers of their nests were seen in

caves and under ledges on the cliffs. Eggs were taken in the latter end of December, 1913.

***Microeca pallida* (*M. fascians pallida*).**—This little bird was common in the forest country, and many nests were seen. A set of four eggs was taken from one nest; these were evidently laid by one bird, as there was only one pair of birds at the nest.

***Microeca flavigaster* (*Kempia f. flavigaster*).**—A few birds were seen along the river, and one nest, containing a single egg, heavily incubated, was found.

***Melanodryas picata* (*M. cucullata subpicata*).**—Met with in forest country, and nearly always in pairs. Their pretty nests were placed securely in the forks of the tea-tree. An unusual set of three eggs was taken from one nest.

***Smicrorornis flavescens* (*S. brevirostris flavescens*).**—These little birds were plentiful in the brush, where they searched the leaves for insects. Many nests were found during the winter months. A *Smicrorornis* slightly larger and brighter in the colouring was obtained on the table-land, and is distinguished by Mr. Mathews as *S. b. subflavescens*; this bird was not seen off the table-land.

***Gerygone albogularis* (*G. olivacea flavigaster*?).**—Found only along the river and creeks, but nowhere plentiful. They were noted as the foster-parent of the Little Bronze-Cuckoo (*Chalcococcyx minutillus*) (*Lamprococcyx m. minutillus*).

***Pœcilodryas cerviniventris* (*P. superciliosa cerviniventris*).**—Common along the water-courses and in the brush growing at the foot of the sandstone bluffs. Many nests were found, each containing a pair of eggs or young.

***Rhipidura albiscapa* (?) (*R. flabellifera buehanani*).**—These birds were fairly common, and many of their curious tailed nests were found.

***Rhipidura dryas* (*Howeavis rufifrons dryas*).**—Only odd birds were seen, in October; they appeared to be making their way south, and did not remain to breed on the M'Arthur River.

***Rhipidura motacilloides* (*Leucocirca tricolor picata*).**—These well-known birds were common, but, unlike their southern representatives, they do not breed in company with the *Grallina*; they prefer the sheltering edges of the sandstone bluffs. They were noted as the foster-parent of *Cacomantis variolosus* (*C. pyrophanus dumetorum*).

***Seisura nana* (*S. inquieta nea*).**—Uncommon; found breeding in the tea-tree country, generally at a good distance from water.

***Myiagra concinna* (*M. rubecula concinna*).**—Uncommon; seen about tea-tree localities, where they breed.

***Graucalus melanops* (*Coracina novæhollandiæ subpallida*).**—A common bird about the river-flats, where it breeds in the coolibah and bloodwood eucalypts.

***Graucalus hypoleucus* (*Coracina h. hypoleuca*).**—Fairly plentiful; were breeding in December.

***Campephaga humeralis* (*Lalage tricolor indistincta*).**—Common. These birds do not leave the M'Arthur during the winter, but the males assume the sombre plumage of the females and young, and do not regain their black and white coats before October, when they commence to breed.

Pomatorhinus temporalls (*Pomatostomus t. intermedius*).—Fairly common, and always in small flocks. Their bulky stick nests were often seen; two and three eggs composed a clutch.

Cinclorhamphus cruralis (*C. c. rogersi*).—Seen on the open flats along the river.

Cinclorhamphus rufescens (*Ptenædus mathewsi horsfieldi*).—Fairly numerous on dry spinifex ridges.

Ephthianura tricolor (*Parephthianura t. distincta*).—A small flock was seen on an open flat near Borroloola, and specimens were obtained for identification.

Cisticola exilis (*C. e. lineacapilla*).—Seen on the grassy flats. They were building in February, 1914, when we left the locality.

Megalurus galactotes (*Dulciornis alisteri melvillensis* ?)—Seen in the reeds along the river and about grassy flats. A deep, cup-shaped nest of this species was found in a tussock of grass in February, 1914, and contained three reddish-speckled eggs.

(?) **Malurus dulcis** (*Leggeornis amabilis dulcis*).—A *Malurus* which, I think, is referable to this species, but which has not yet been identified from the skins sent, was fairly common in the spinifex on the sandstone ridges, where it was found breeding. Eggs of the Narrow-billed Bronze-Cuckoo (*Chalcococcyx basalis*) (*Neochalcites b. modesta*) were found in some nests.

Malurus coronatus (*Rosina c. macgillivrayi*).—A purple-crowned *Malurus* was very plentiful in the cane-grass along the river from Borroloola to the table-land divide. From a number of skins sent it was identified as above. This bird was recently discovered by Mr. W. M'Lennan while collecting for Dr. Macgillivray on the Leichhardt River. Eggs of this bird were taken by me and described by Mr. White, of Belltrees.* This bird was noted as the foster-parent of *Cacomantis variolosus* (*C. pyrrophanus dumetorum*).

Malurus cruentatus (*Ryania melanocephala cruentata*).—Very common in the long grass and swampy localities, where they were breeding. They were noted as the foster-parents of *Chalcococcyx basalis* (*Neochalcites b. modesta*).

Amytornis woodwardi.—These birds are found in high sandstone country, and are very shy. They do not wander far from the rocks, into which they dart when disturbed. An account of the finding of this bird has already appeared in *The Emu*,† and a further long search revealed the nest and eggs. The nest is placed in the top of a bunch of spinifex, and much resembles that of the Masked Grass-Finch (*Poephila personata*) (*Neopoephila p. personata*). Noted as the foster-parent of *Cacomantis variolosus* (*C. pyrrophanus dumetorum*).

Artamus leucogaster (*A. leucorhynchus harterti*).—These birds were not common; a few were seen along the river and about swamps. One nest contained three young birds.

Artamus supercilliosus (*Campbellornis s. phæus*).—Seen in flocks about the Lower M'Arthur. They were very busy feeding in the red-flowered *Grevillea*. The stomachs, when examined, contained a thick yellow coating, evidently honey. No insects were found in the stomachs.

* *Emu*, Bulletin No. 4.

† *Emu*, vol. xiii., part 3, pp. 188-190.

Artamus personatus (*Campbellornis p. gracilis*).—Found in large flocks on the Barclay Table-land, where they were breeding, and also on the M'Arthur, where they were feeding, in company with *A. superciliosus*, on the flowers of the *Grevillea*. An examination of the stomachs revealed the same conditions as in *A. superciliosus*. The latter bird was not seen on the table-land.

Artamus melanops (*Austrartamus m. florenciæ*).—Common both on the table-land and the M'Arthur. They were breeding on the table-land in March and on the M'Arthur in November and December.

Artamus minor (*Micrartamus m. derbyi*).—These little birds were common, especially about the high sandstone bluffs. They nested in small holes in the sandstone.

Trichoglossus rubritorques.—Very common all along the M'Arthur, where they bred freely, from May to December, in the hollow spouts of the swamp gums. Two eggs form a clutch.

Ptilosclera versicolor (*Psittenteles v. mellori*).—Only a few were seen about Borroloola, but they were very plentiful further west, where they were busy feeding on the flowers of the bloodwood eucalypt. A nest examined in July, 1913, contained three young birds.

Calyptorhynchus macrorhynchus (*C. banksii macrorhynchus*).—Large flocks of these birds, numbering from four to five hundred, were seen on the head of the M'Arthur and Kilgour Rivers, where they were feeding on the seeds of a creeping plant growing on the plains. They were common all the way to the coast, but only in small flocks. They do not appear to breed on the M'Arthur, as no nests were seen:

Cacatua galerita (*Cacatoes g. melvillensis*).—Very common all along the river. They bred freely during September in the hollow spouts of the gum and melaleuca trees growing along the river-flats.

Cacatua roseicapilla (*Eolophus r. kuhli*).—Very common birds on the M'Arthur. They appear to breed chiefly from March till June. This is probably from the fact that they depend largely on the seeds of small plants and grasses for their food.

Calopsitta novæ-hollandiæ (*Leptolophus auricomis obscurus*).—Seen in fairly large flocks, generally feeding on the ground.

Ptilistes coccineopterus (*Aprosmictus erythropterus coccineopterus*).—Common. Nests with young were found in September.

Platyercus browni (*P. venustus venustus*).—Though rather scarce, birds were generally to be found along the river, feeding on the seeds of the melaleuca trees. They were always seen in pairs.

Psephotus dissimilis.—Skins of these birds were first obtained by me at Pine Creek, N.T., in September, 1896. They were supposed to be *Psephotus chrysopterygius*. This, however, was wrong, and two years later the Pine Creek bird was named as above from further skins obtained from that place. I thus missed the honour of being the first to describe this bird, though I was the first to obtain the skins. *P. chrysopterygius* was obtained somewhere in the Normanton district, and does not appear to have been found since it was described by Gould. *P. dissimilis* was fairly plentiful on the dry spinifex and stringy-bark ridges of the lower M'Arthur. A series of skins was obtained.

Melopsittacus undulatus (*M. u. intermedius*).—Very plentiful about the head of the river, where they were breeding in the stunted timber. None was seen about Borroloola.

Podargus phalaenoides (*Podargus strigoides phalaenoides*).—A number of nests was found during October and November, but they mostly had young. A second clutch of eggs was laid in January. In some instances eggs were laid in the same nests in which young were seen previously.

Colluricincla brunnea (*C. b. brunnea*).—Found mostly on the flat country, and occasionally on low sandstone hills. The nests were found generally in the tops of hollow stumps, and occasionally in the fork of a thick shrub. A set of eggs was taken in one instance from an old Babbler's nest. In several instances four eggs formed a clutch.

Colluricincla woodwardi.—These birds were first noticed in high sandstone country at the junction of the M'Arthur and Clyde Rivers, in September, but they were not breeding. Later we found them in the same belt of country, west of Borroloola. An account of the taking of the first nest has already appeared in *The Emu*.^{*} Three weeks after taking this nest I again visited the same locality, and was successful in taking several sets, each containing three eggs. The nests were all placed in holes or on the ledges of the large overhanging sandstone rocks. All were composed of the fine reddish roots of the spinifex. The country inhabited by these birds has to be seen before an idea of its roughness can be formed.

Grallina picata (*G. cyanoleuca neglecta*).—Common birds on all the Northern rivers and lagoons. They were noted as foster-parents of *Eudynamys cyanocephala* (*E. orientalis subcyanocephalus*).

Gymnorhina tibicen (*G. t. terræreginæ*).—This bird was plentiful on the Barclay Table-land during our visit in the beginning of 1913, but we did not obtain any eggs. Another bird which I think is slightly different from the table-land bird was found on the M'Arthur. As I wished to obtain the eggs of the table-land bird for Mr. White, I sent my assistant, V. White, back there in October. He was successful in getting a good series of their eggs during October and November, while I was successful in getting a series of eggs of the M'Arthur River bird in the same months. Skins of the M'Arthur bird await, in England, identification by Mr. G. M. Mathews.

Craicticus nigrogularis (*C. n. picatus*).—Fairly common on the M'Arthur, where they were breeding. They appear to inhabit any class of country.

Falcunculus whitii (*F. frontatus whitei*).—This bird was rare on the M'Arthur, and only a few pairs were seen. These were always on the dry stringybark ridges, where they were hunting among the dead leaves and dry tree-stems for insects. Two nests were found in the forks of the topmost branches of tall stringy-bark saplings. One nest contained a pair of fresh eggs; the other contained one egg from which the young bird was just emerging and one addled egg.

Oreoica cristata (*O. c. pallescens*).—These birds frequent the dry spinifex and stringybark ridges, where their bell-like notes were often heard. A nest found in the top of a dead stump 4 feet from the ground contained three fresh eggs. Several hairy caterpillars were placed on the edge of the nest.

^{*} *Emu*, vol. xiii., part 4, pp. 210-212.

Pachycephala melanura (*P. pectoralis violetæ*).—Were found in the brush and mangroves along the river banks; they did not appear to be common.

Pachycephala pallida (*Lewinornis rufiventris pallidus*).—This bird was plentiful in all localities, and, after the rains, bred freely. Several nests contained the unusual number of four eggs.

Neositta leucoptera (*N. pileata subleucoptera*).—Seen in small flocks both on the table-land and on the M'Arthur. Nests were found in coolibah and stringybark trees. Two or three eggs formed a clutch.

Climaeteris melanura (*Whitlocka m. alexandræ*).—These birds were common on the coastal rivers, and were generally in pairs; at odd times three birds were seen together. A number of nests was found. A hollow spout formed the nesting site, and two eggs formed a clutch.

Dicaeum hirundinaceum (*Austrodicaeum h. tormenti*).—A common bird in most localities about the M'Arthur. It was very often seen feeding in the mistletoe, which is very plentiful in that locality. Several nests suspended from twigs at the top of tall stringybark saplings were found.

Pardalotus uropygialis (*P. melanocephalus uropygialis*).—Common birds in the sandy country, where they were busy drilling holes in sandy banks during the winter months.

Melithreptus lætior (*M. gularis lætior*).—This handsome Honey-eater was frequently seen in the tall stringybark timber, and its cheerful ringing notes were often heard. A sharp look-out was kept for nests, but without success.

Melithreptus albogularis (*M. lunatus albogularis*).—Common in the flowering mistletoes and *Grevilleas*.

Myzomela pectoralis (*Cissomela p. pectoralis*).—These birds were often seen in the flowering trees, and their tiny nests were found in a patch of narrow-leaved tea-tree.

Myzomela obscura (*Melomyza o. obscura*).—These little birds were uncommon, and were only seen about the flowering tea-tree.

Glyciphila fasciata (*Ramsayornis f. fasciatus*).—A very common bird. The bulky nests, composed of strips of melaleuca bark, were frequently seen hanging from the end of a bough, very often over water. On some occasions, however, they were seen a considerable distance from water. The eggs of the Brush-Cuckoo (*Cacomantis variolosus*) (*C. pyrrophanus dumetorum*) were often found in their nests.

Entomophila picta (*E. p. borealis*).—A Honey-eater closely resembling the southern Painted Honey-eater was found at M'Arthur Station, on the M'Arthur River. It was feeding on the flowers of the bauhinia trees which grew on the black-soil flats. From skins forwarded to Mr. H. L. White, of Belltrees, it was found to be new, and the name of *Entomophila picta borealis* was suggested by that gentleman. The birds were found at M'Arthur Station, and were not seen elsewhere.

Conopophila rufogularis (*C. r. queenslandica*).—Very common birds. They bred freely when the rains fell at the end of 1913 and the beginning of 1914. They were very pugnacious during the breeding season, and often attacked each other very savagely. They were

noted as the foster-parent of *Cacomantis variolosus* (*C. pyrophanus dumetorum*).

Stigmatops ocularis (*S. indistincta rufescens*).—A very common bird, whose cheerful note could be heard all day among the flowering shrubs.

Ptilotis sonora (*Meliphaga s. forresti*).—A common bird in tea-tree localities. A number of nests was found; these contained two or three eggs. The bird was noted as the foster-parent of *Cuculus pallidus* (*Heteroscenes p. occidentalis*).

(?) **Ptilotis keartlandi** (*Lichenostomus k. alexandrensis* ?)—A Honey-eater very closely resembling this bird, but which has not yet been identified, was obtained in the high sandstone ranges along the M'Arthur River.

(?) **Ptilotis flavescens** (*Ptilotula f. melvillensis*).—A *Ptilotis* closely resembling *P. flavescens* was very common on the M'Arthur, and a number of nests was found. In no instance did the nests contain more than a single egg or young bird.

Ptilotis unicolor (*Stomiopera u. unicolor*).—Common in the brush along the river and near sandstone bluffs. Several of their pretty nests were found along the river; each contained a pair of eggs.

Myzantha flavigula (*M. f. alligator*).—Seen at the head of the M'Arthur and on the table-land.

Entomyza albipennis (*Entomyzon cyanotis albipennis*).—Fairly common about Borroloola, on the M'Arthur. They were found breeding in old nests of the Babbler (*Pomatiorhinus temporalis*) (*Pomatostomus t. intermedius*).

Tropidorhynchus argenticeps (*Philemon a. alexis*).—A common bird about the Lower M'Arthur, where it was found breeding.

Philemon sordidus (*Microphilemon orientalis sordidus*).—Fairly numerous, and generally in company with *T. argenticeps* (*P. a. alexis*). A number of nests was found, several of which contained an egg of *Eudynamis cyanocephala* (*E. c. subcyanocephalus*).

Mirafraga secunda (*M. javanica rufescens*).—A very common bird on the table-land, and fairly common on the black-soil flats on the M'Arthur.

Taniopygia castanotis (*T. c. alexandrae*).—A very common bird in the gidgea and brush on the table-land, and also plentiful on the head of the M'Arthur and Kilgour Rivers. It was not seen on the Lower M'Arthur.

Stizoptera bichenovii (*S. b. bandi*).—Very common in the brush along the M'Arthur River, where they bred freely.

Munia pectoralis (*Heteromunia p. incerta*).—A few of these birds appeared on the table-land in February and March, and bred in the grass on the plains. The nest is a bulky grass structure placed low in the grass. Five and six pure white eggs formed a clutch.

Bathilda ruficauda (*B. r. subclarescens*).—These birds frequent the cane-grass along the river; generally they were found in small flocks. They breed in the cane-grass in June.

Poephila acuticauda (*P. a. hecki*).—Seen in all classes of country on the M'Arthur. Their bulky grass nests were placed in bushes and

trees, but never on the ground. During the breeding season the tail feathers of this bird are much longer than at other seasons.

Poephila personata (*Neopoephila p. personata*).—Often seen in small flocks of from eight to twelve. This bird builds its bulky grass nest in short grass, often almost, if not quite, on the ground. It resembles a bunch of dead grass. Small pieces of charcoal are built in with the layers of grass in forming the nest, and loose pieces are left in with the eggs. When first laid the eggs are pure white, but in a few days they take on a sooty appearance from coming in contact with the charcoal. This is intensified as the brooding is carried on, and when hard set the eggs are much the colour of the charcoal. The bill of this bird in life is a bright yellow, but fades after skinning.

Poephila gouldiæ (*P. g. gouldiæ*).—This handsome Finch was often seen on dry ridges at long distances from water. It resorts to small hollows in trees for nesting purposes, and several pairs nest in the same hollow. An instance of this came under my notice while collecting on the M'Arthur. In a swamp gum growing on the bank of the river, three nesting hollows were found at heights varying from 20 to 40 feet from the ground. One hollow contained five eggs, of two distinct types; a second contained no fewer than fourteen perfectly fresh eggs, of three distinct types; the third hollow was beyond reach. After taking the eggs, I watched the birds assemble about the different hollows; no fewer than six pairs gathered at one hollow and three at the other. At the hollow that was not disturbed several birds were busy carrying in bits of straw and dead coolibah leaves.

Neochmia phaeton (*N. p. phaeton*).—Frequents the cane-grass and pandanus palms growing in marshy localities. The butts of the pandanus leaves often formed a nesting site. At other times a hollow spout or jutting piece of bark was chosen.

Oriolus affinis (*Mimeta sagittata affinis*).—A fairly common bird on the M'Arthur. It was often found feeding in fig trees and on wild berries growing along the river. Nests were found during December and January.

Chlamydera nuchalis (*Rogersornis nuchalis melvillensis*).—This is a very common bird all through the coastal fall, and many nests were found; each contained a single egg. These birds started to rebuild their play-grounds in September, but it was not till November that eggs were found.

Corvus coronoides (*Corvus cecilæ cecilæ*).—A common bird on the table-land, but rather uncommon on the coastal fall. It breeds freely in the gidgea timber along water-courses.

Birds of all kinds appear to be affected by the season in the Northern Territory, and, though a few breed during the dry seasons, the majority waits for the rains.

CONTENTS OF CROPS AND GIZZARDS OF BIRDS EXAMINED.

20/2/13. — Gizzard of ♀ *Podargus phalænoides* (*P. strigoides phalænoides*) contained remains of large grasshoppers and hard-shelled beetles.

22/2/13. — Gizzard of ♂ *Podargus phalænoides* contained remains of beetles and the head of a large grasshopper.

22/2/13. — Stomach of ♂ *Neositta leucoptera* (*N. pileata sub-*

leucoptera) contained two small caterpillars and several minute beetles.

22/2/13.—Stomach of ♂ *Neositta leucoptera* (*N. pileata sub-leucoptera*) contained four very small beetles.

22/2/13.—Stomach of ♂ *Ægotheles novæ-hollandiæ* (*Æ. cristata leucogaster*) contained remains of small beetles.

25/2/13.—Stomachs of ♂ and ♀ *Artamus melanops* (*Austrartamus melanops florenciæ*) contained remains of large green caterpillars.

25/2/13.—Stomach of ♂ *Pachycephala pallida* (*Lewinornis rufiventris pallida*) contained remains of small caterpillars.

26/2/13.—Stomachs of ♂ *Glareola grallaria* (*Stiltia isabella*) contained remains of small beetles and caterpillars.

27/2/13.—Stomachs of two ♂ *Melithreptus lætior* (*M. gularis lætior*) contained a number of white scale-insects, which the birds were gathering from the leaves of mistletoe.

1/3/13.—Stomachs of ♂ and ♀ *Pteropodocys phasianella* (*P. maxima pallida*) contained several green caterpillars, 1 inch in length, and remains of grasshoppers.

3/3/13.—Stomach of ♀ *Pardalotus uropygialis* (*P. melanocephalus uropygialis*) contained numerous small beetles and a small caterpillar.

4/3/13.—Stomachs of *Mirafra secunda* (*M. javanica rufescens*), two males, contained grass seeds and a small caterpillar.

4/3/13.—Stomach of ♀ *Pachycephala pallida* (*Lewinornis rufiventris pallida*) contained remains of two small caterpillars.

4/3/13.—Stomachs of ♂ and ♀ *Conopophila rufogularis* (*C. r. queenslandica*) contained respectively several small brown caterpillars and a large grasshopper.

5/3/13.—Stomach of ♀ *Philotis sonora* (*Meliphaga s. forresti*) contained remains of a large green caterpillar.

17/3/13.—Stomach of ♂ *Turnix pyrrhonorax* (*Austroturnix p. pyrrhonorax*) contained a number of grass seeds and a small cockroach.

17/3/13.—Stomachs of ♀ and ♂ *Ephthianura tricolor* (*Parephthianura t. distincta*) contained a few grass seeds, small bits of white gravel, and a few small beetles.

18/3/13.—Stomach of ♀ *Philotis sonora* (*Meliphaga s. forresti*) contained three large seeds of the mistletoe.

20/3/13.—Crops of *Munia pectoralis* (*Heteromunia p. incerta*), ♂ and ♀, contained a number of small white grass seeds.

20/3/13.—Stomach of ♂ *Chalcococcyx basalis* (*Neochalcites b. modesta*) contained a hairy caterpillar and an earwig.

20/3/13.—Stomach of *Cisticola exilis* (*C. e. lineocapilla*) contained a large brown caterpillar.

20/3/13.—Stomach of ♀ *Chalcococcyx basalis* (*Neochalcites b. modesta*) contained a number of soft red and black wingless beetles.

21/3/13.—Gizzard of ♀ *Nettion gibberifrons* contained nothing but gravel.

25/3/13.—Stomach of ♂ *Gymnorhina tibicen* (*G. t. terræreginæ*) contained several large grasshoppers.

26/3/13.—Crops of ♂ and ♀ *Melopsittacus undulatus* (*M. u. intermedius*) contained a quantity of small grass seeds.

28/3/13.—Stomach of ♂ *Strix delicatula* (*Tyto alba delicatula*) contained remains of two frogs.

29/3/13.—Stomach of ♂ *Chalcococcyx basalis* (*Neochalcites b. modesta*) contained remains of caterpillars.

29/3/13.—Stomach of ♂ *Malurus cruentatus* (*Ryania melanocephala cruentata*) contained a large green caterpillar.

31/3/13.—Stomach of ♂ *Smicrornis flavescens* (*S. brevirostris subflavescens*) contained a number of minute leaf-eating beetles.

31/3/13.—Crops of ♂ and ♀ *Tæniopygia castanotis* (*T. c. alexandræ*) contained numbers of small grass seeds.

1/4/13.—Stomach of ♀ *Erythronyx cinctus* (*E. c. mixtus*) contained remains of small water-beetles.

3/4/13.—Stomach of *Cisticola exilis* (*C. e. lineocapilla*) contained a small grasshopper.

4/4/13.—Stomach of ♀ *Cerchneis cenchroides* (*C. c. milligani*) contained remains of grasshoppers.

4/4/13.—Stomach of ♀ *Myzantha flavigula* (*M. f. alligator*) contained remains of grasshoppers.

5/4/13.—Stomach of ♀ *Cerchneis cenchroides* (*C. c. milligani*) contained remains of large grasshoppers.

5/4/13.—Stomach of ♀ *Cinclorhamphus cruralis* (*C. c. rogersi*) contained remains of grasshoppers.

5/4/13.—Stomach of ♀ *Cinclorhamphus cruralis* (*C. c. rogersi*) contained remains of grasshoppers.

8/4/13.—Stomach of immature ♂ *Cisticola exilis* (*C. e. lineocapilla*) contained small caterpillars.

9/4/13.—Stomach of ♀ *Ægotheles novæ-hollandiæ* (*Æ. cristata leucogaster*) contained remains of beetles.

9/4/13.—Stomach of ♂ *Gymnorhina tibicen* (*G. t. terræreginæ*) contained remains of large grasshoppers.

16/4/13.—Stomachs of ♂ and ♀ *Gymnorhina tibicen* (*G. t. terræreginæ*) contained remains of large grasshoppers.

20/5/13.—Stomachs of ♂ and ♀ *Ptilotis unicolor* (*Stomiopera u. unicolor*) contained seeds of small black berries.

20/5/13.—Stomach of ♀ *Ninox boobook* (*Spiloglaux b. mixta*) contained remains of a small rat.

20/5/13.—Stomach of ♂ *Dacelo cervina* (*D. leachii cervina*) contained several large grasshoppers.

21/5/13.—Stomach of ♂ *Stigmatops ocularis* (*S. indistincta rufescens*) contained a few small honey-bees.

21/5/13.—Stomach of *Eurostopodus argus* (*E. a. harterti*) contained remains of hard-shelled beetles.

21/5/13.—Stomach of ♀ *Tropidorhynchus argenteiceps* (*Philemon a. alexis*) contained a number of small beetles.

22/5/13.—Stomach of ♂ and ♀ *Poephila acuticauda* (*P. a. heeki*) contained a few grass seeds.

22/5/13.—Stomach of ♂ *Podargus phalænoides* (*P. strigoides phalænoides*) contained remains of large grasshoppers.

22/5/13.—Gizzard of ♀ *Nettapus pulchellus* contained a number of small seeds of a plant growing at the edge of fresh-water lagoons.

23/5/13.—Stomachs of ♂ and ♀ *Tropidorhynchus argenteiceps* (*Philemon a. alexis*) contained several native bees. When shot, a quantity of honey ran out of their bills; they were feeding on the blossoms of the red *Grevillea*.

23/5/13.—Crop of ♀ *Synois australis* (*S. ypsilophorus cervinus*) contained a number of grass seeds.

23/5/13.—Stomach of ♂ *Ptilotis sonora* (*Meliphaga s. forresti*) contained a number of small black ants.

23/5/13.—Stomach of ♀ *Melithreptus albogularis* (*M. lunatus albogularis*) contained a few native bees and other small insects.

23/5/13.—Stomach of ♂ *Myzomela pectoralis* (*Cissomela p. pectoralis*) contained two native bees;

23/5/13.—Crop of ♀ *Poephila gouldiæ* (*P. g. gouldiæ*) contained a few grass seeds.

24/5/13.—Crop of ♀ *Erythrorhynchus radiatus* contained remains of large grasshoppers.

26/5/13.—Crop of immature ♀ *Neochmia phaeton* (*N. p. phaeton*) contained a few grass seeds.

26/5/13.—Stomach of ♂ *Alcyon pulchra* (*A. azurea pulchra*) contained a small fish.

26/5/13.—Stomach of immature ♂ *Cacomantis variolosus* (*C. pyrophanus dumetorum*) contained remains of a large hairy caterpillar.

26/5/13.—Crop of ♂ *Calyptorhynchus macrorhynchus* (*C. banksii macrorhynchus*) contained a number of kernels of the seeds of the bauhinia tree.

27/5/13.—Stomachs of two immature ♂ *Malurus coronatus* (*Rosina c. macgillivrayi*) contained small caterpillars.

27/5/13.—Stomach of adult ♂ *Malurus coronatus* (*Rosina c. macgillivrayi*) contained several small beetles.

27/5/13.—Stomach of ♂ *Pæcilodryas cerviniventris* (*P. superciliosa cerviniventris*) contained a number of small hard-shelled beetles, which were found on damp ground.

27/5/13.—Stomach of ♀ *Pæcilodryas cerviniventris* (*P. superciliosa cerviniventris*) contained a number of mud-frequenting beetles.

27/5/13.—Stomach of ♀ *Dacelo cervina* (*D. leachii cervina*) contained remains of large grasshoppers.

28/5/13.—Crops of ♂ and ♀ *Platycercus browni* (*P. venustus venustus*) contained a number of seeds of the wattle.

28/5/13.—Stomach of ♂ *Climacteris melanura* (*C. m. alexandrae*) contained a number of small black beetles.

28/5/13.—Gizzard of *Nettapus pulchellus* contained a number of small seeds of a plant growing in the water.

29/5/13.—Stomach of ♀ *Falco lunulatus* (*F. longipennis apseyi*) contained a large grasshopper.

29/5/13.—Stomach of ♀ *Butorides stagnatilis* (*B. striata stagnatilis*) contained seven whole grasshoppers.

30/5/13.—Stomach of *Cisticola exilis* (*C. e. lineocapilla*) contained a small grasshopper.

30/5/13.—Stomach of ♂ and ♀ *Pomatorhinus temporalis* (*Pomatorhinus temporalis intermedius*) contained a number of small insects of different kinds.

30/5/13.—Crops of two ♂ *Geophaps smithi* (*G. s. smithi*) contained a number of wattle and grass seeds.

2/6/13.—Stomach of ♀ *Mesocallus osculans* (*Owenavis o. osculans*) contained several large bugs.

3/6/13.—Stomach of ♂ *Podargus phalænoides* (*P. strigoides phalænoides*) contained remains of large grasshoppers.

3/6/13.—Crop of ♂ *Poephila personata* (*Neopoephila p. personata*) contained a few spinifex seeds.

4/6/13.—Crop of ♂ *Turnix castanota* (*Austroturnix c. castanota*) contained a number of spinifex seeds.

4/6/13.—Crop of ♀ *Poephila personata* (*Neopoephila p. personata*) contained a few grass seeds.

4/6/13.—Stomach of ♀ *Myzomela pectoralis* (*Cissomela p. pectoralis*) contained a few native bees.

5/6/13.—Crop of ♂ *Elanus axillaris* (*E. a. parryi*) contained remains of a mouse.

5/6/13.—Stomach of ♂ *Alcyone pulchra* (*A. azurea pulchra*) contained remains of a fish.

5/6/13.—Stomach of ♂ *Megalurus galactotes* (*Dulciornis alisteri melvillensis*) contained a small wood cockroach and small beetles.

5/6/13.—Stomach of ♂ *Megalurus galactotes* (*Dulciornis alisteri melvillensis*) contained a small caterpillar and some small beetles.

6/6/13.—Stomach of ♂ *Malurus cruentatus* (*Ryania melanocephala cruentata*) contained a small brown caterpillar.

6/6/13.—Stomach of ♀ *Malurus cruentatus* (*Ryania melanocephala cruentata*) contained a small grasshopper and some small beetles.

6/6/13.—Stomach of ♀ *Malurus cruentatus* (*Ryania melanocephala cruentata*) contained a number of small beetles.

6/6/13.—Stomach of ♂ *Climacteris melanura* (*Whitlocka m. alexandrae*) contained a small bark moth and several small insects.

10/6/13.—Stomach of ♂ *Mesocalius osculans* (*Owenavis o. osculans*) contained a number of small striped bugs.

10/6/13.—Stomachs of ♂ and ♀ *Pardalotus uropygialis* (*P. melanocephalus uropygialis*) contained a number of small beetles.

12/6/13.—Crops of three ♂ and three ♀ *Poephila gouldiae* (*P. g. gouldiae*) contained a number of cane-grass seeds.

13/6/13.—Stomach of ♀ *Ninox occidentalis* (*Hieracoglaux connivens occidentalis*) contained remains of large grasshoppers.

16/6/13.—Stomach of ♂ *Colluricincla brunnea* (*C. b. brunnea*) contained a number of small insects and some small purple berries.

16/6/13.—Stomach of ♀ *Colluricincla brunnea* (*C. b. brunnea*) contained a large brown spider and a grasshopper.

16/6/13.—Stomach of ♂ *Falcunculus whitii* (*F. frontatus whitei*) contained a large green bark cricket.

16/6/13.—Stomach of ♀ *Melithreptus laetior* (*M. gularis laetior*) contained several small beetles.

17/6/13.—Stomach of ♀ *Colluricincla brunnea* (*C. b. brunnea*) contained remains of a large grasshopper and a small black dung-beetle.

17/6/13.—Stomach of ♂ *Ptilotis sonora* (*Meliphaga s. forresti*) contained a number of small black ants.

17/6/13.—Stomachs of two ♂ *Ptilotis flavescens* (*Ptilotula f. melvillensis*) contained a number of native bees.

18/6/13.—Stomach of ♂ *Chalcococcyx basalis* (*Neochalcites b. modesta*) contained a number of small hairy caterpillars.

18/6/13.—Stomach of ♀ *Micræca flavigaster* (*Kempia f. flavigaster*) contained a number of black ants.

18/6/13.—Stomach of immature ♂ *Micræca flavigaster* (*Kempia f. flavigaster*) contained a number of black ants.

18/6/13.—Stomach of ♂ *Mesocalius osculans* (*Owenavis o. rogersi*) contained a number of red and black bugs and spotted ladybirds.

18/6/13.—Crops of ♂ and ♀ *Bathilda ruficauda* (*B. r. subclarescens*) contained a number of cane-grass seeds.

23/6/13.—Stomach of ♂ *Pachycephala melanura* (*P. pectoralis violetæ*) contained the remains of golden-winged beetles.

23/6/13.—Stomach of ♀ *Pachycephala melanura* (*P. pectoralis violetæ*) contained a small green caterpillar.

23/6/13.—Stomach of ♀ *Ninox occidentalis* (*Hieracoglaux connivens occidentalis*) contained remains of large grasshoppers.

24/6/13.—Stomach of ♂ *Smicrornis flavescens* (*Smicrornis brevirostris subflavescens*) contained a number of minute leaf-eating beetles.

24/6/13.—Stomach of ♀ *Micræca pallida* (*M. fascians pallida*) contained several round spotted ladybirds.

26/6/13.—Stomach of ♂ *Pachycephala pallida* (*Lewinornis rufiventris pallidus*) contained a large grasshopper.

26/6/13.—Stomach of ♀ *Pachycephala pallida* (*Lewinornis rufiventris pallidus*) contained the wings of a small green ladybird and the remains of other insects.

26/6/13.—Stomach of ♂ *Seisura nana* (*S. inquieta nea*) contained two small spotted ladybirds.

27/6/13.—Stomach of ♂ *Artamus melanops* (*Austrartamus m. florenciæ*) contained honey from the *Grevillea* blossom.

27/6/13.—Stomach of ♀ *Neositta leucoptera* (*N. pileata subleucoptera*) contained remains of several wood-bugs.

27/6/13.—Stomach of ♀ *Melithreptus albogularis* (*M. lunatus albo-gularis*) contained a few small blossom insects.

27/6/13.—Stomach of ♀ *Edicnemus grillarius* (*Burhinus magnirostris rufescens*) contained several small land-shells.

27/6/13.—Stomach of ♂ *Edicnemus grillarius* (*Burhinus magnirostris rufescens*) contained remains of large grasshoppers.

11/8/13.—Stomach of ♂ and ♀ *Cinclorhampus rufescens* (*Ptenædus mathewsi horsfieldi*) contained numbers of small black bugs.

12/8/13.—Stomach of ♀ *Entomophila picta* (*E. p. borealis*) contained a number of large mistletoe berries.

12/8/13.—Stomach of ♂ *Halcyon sanctus* (*Sauropatis s. ramsayi*) contained remains of a small fish and wings of a hard-shelled carab.

14/8/13.—Stomach of ♂ *Graucalus melanops* (*Coracina novæ-hollandiæ subpallida*) contained a number of mistletoe berries and a large brown longicorn beetle.

14/8/13.—Stomach of ♀ *Ægialitis nigrifrons* (*Elseya melanops russata*) contained a number of small black water-beetles.

14/8/13.—Stomach of ♂ *Artamus minor* (*Micrartamus minor derbyi*) contained a small leaf Buprestid beetle, a small black hornet, and several small winged ants.

17/8/13.—Stomach of immature ♀ *Strix novæ-hollandiæ* (*Tyto n. melvillensis*) contained the hind legs and tail of a rat, swallowed in one piece. From the tip of the tail to where the fore-part had been severed was just 8 inches long.

18/8/13.—Stomachs of ♂ and ♀ *Entomophila picta* (*E. p. borealis*) contained a number of mistletoe berries.

18/8/13.—Stomach of ♂ *Oriolus affinis* (*Mimeta sagittata affinis*) contained the remains of a number of spotted ladybirds.

18/8/13.—Stomach of ♂ *Lophophaps plumifera* (*L. p. plumifera*) contained seeds of several kinds of small vines.

21/8/13.—Crop of ♂ *Calyptorhynchus macrorhynchus* (*C. banksii macrorhynchus*) contained seeds of the bauhinia tree.

22/8/13.—Crop of ♂ *Lophophaps plumifera* (*L. p. plumifera*) contained a great number of seeds of a pea bush and a few seeds of a wild convovulus.

23/8/13.—Stomach of ♀ *Dupetor gouldi* (*D. flavicollis olivei*) (?) contained two small shrimps.

23/8/13.—Stomach of ♀ *Oriolus affinis* (*Mimeta sagittata affinis*) contained the remains of a number of red and black bugs.

24/8/13.—Stomach of ♂ *Corvus coronoides* (*C. cecilæ cecilæ*) contained remains of large grasshoppers and several cattle ticks.

27/8/13.—Stomach of ♀ *Graucalus melanops* (*Coracina novæ-hollandiæ subpallida*) contained a number of mistletoe berries and the remains of a large black longicorn beetle.

27/8/13.—Stomach of ♂ and ♀ *Neositta leucoptera* (*N. pileata subleucoptera*) contained remains of small bark insects.

27/8/13.—Crops of ♂ and ♀ *Stizoptera bichenovii* (*S. b. bandi*) contained small grass seeds.

2/9/13.—Stomach of ♂ *Hieracidea berigora* (*Ieracidea b. melvillensis*) contained a lizard 10 inches long.

5/9/13.—Stomach of ♂ *Colluricincla woodwardi* contained the remains of small grasshoppers.

MEASUREMENTS OF NESTS.

Date.	Name of Bird.	Across top.		Depth.		Height from ground.
		Outside.	Inside.	Outside.	Inside.	
		mm.	mm.	mm.	mm.	ft.
24/2/13	<i>Milvus affinis</i> (<i>M. korschun affinis</i>)	677	229	356	51	15
27/2/13	<i>Pteropodocys phasianella</i> (<i>P. maxima pallida</i>)	178	102	64	26	18
27/2/13	" " " " " " " " " " " " " " " "	178	89	51	26	20
27/2/13	<i>Milvus affinis</i> (<i>M. korschun affinis</i>)	755	255	382	77	17
28/2/13	<i>Pteropodocys phasianella</i> (<i>P. maxima pallida</i>)	178	77	64	26	25
28/2/13	<i>Campephaga humeralis</i> (<i>Lalage tricolor indistincta</i>)	63	39	26	14	8
1/3/13	<i>Milvus affinis</i> (<i>M. korschun affinis</i>)	610	230	305	52	23
1/3/13	<i>Pteropodocys phasianella</i> (<i>P. maxima pallida</i>)	155	102	77	39	20
4/3/13	<i>Pachycephala pallida</i> (<i>Lewinornis rufiventris pallidus</i>)	89	58	53	39	9
4/3/13	<i>Conopophila rufogularis</i> (<i>C. r. queenslandica</i>)	58	39	64	46	15
4/3/13	" " " " " " " " " " " " " " " "	78	39	52	45	7
4/3/13	" " " " " " " " " " " " " " " "	64	39	78	52	4
4/3/13	<i>Pachycephala pallida</i> (<i>Lewinornis rufiventris pallida</i>)	89	52	58	33	8
4/3/13	<i>Pachycephala pallida</i> (<i>Lewinornis rufiventris pallida</i>)	84	58	52	33	10
5/3/13	<i>Ptilotis sonora</i> (<i>Meliphaga s. forresti</i>)	76	58	58	45	25
17/3/13	<i>Cisticola exilis</i> (<i>C. e. alexandræ</i>)	52	27	102	39	3
18/3/13	<i>Haliastur sphenurus</i>	840	255	509	78	15
25/3/13	" " " " " " " " " " " " " " " "	814	280	508	103	25
30/3/13	" " " " " " " " " " " " " " " "	814	357	407	128	19
6/6/13	<i>Hieraetus morphnoides</i>	660	230	407	50	58
19/6/13	" " " " " " " " " " " " " " " "	705	230	407	77	64
26/6/13	<i>Uroaetus audax</i> (<i>U. a. carteri</i>)	1063	535	760	130	59
3/7/13	<i>Haliæetus leucogaster</i>	1704	610	2135	178	88
16/8/13	<i>Uroaetus audax</i> (<i>U. a. carteri</i>)	1065	510	1225	102	114
22/8/13	<i>Hieracidea berigora</i> (<i>Ieracidea b. melvillensis</i>)	535	256	560	78	72
23/8/13	<i>Hieraetus morphnoides</i>	560	256	358	78	64
23/8/13	<i>Falco lunulatus</i> (<i>F. longipennis apseyi</i>)	508	177	356	78	78
12/9/13	<i>Erythroriorchis radiatus</i>	915	256	455	78	64
12/9/13	<i>Falco lunulatus</i> (<i>F. longipennis apseyi</i>)	688	175	455	52	67
14/9/13	<i>Erythroriorchis radiatus</i>	660	256	330	52	49
17/9/13	<i>Gypoictinia melanosternon</i> (<i>G. m. decepta</i>)	778	330	560	102	65
26/9/13	<i>Accipiter torquatus</i> (<i>A. cirrocephalus broomei</i>)	535	178	230	52	55
22/9/13	<i>Neositta leucoptera</i> (<i>N. pileata subleucoptera</i>)	50	40	75	37	10
1/10/13	<i>Pacilodryas cerviniventris</i> (<i>P. superciliosa cerviniventris</i>)	75	42	50	30	5
11/11/13	<i>Melanodryas picata</i> (<i>M. cucullata subpicata</i>)	70	50	65	30	9
1/11/13	<i>Micræca flavigaster</i> (<i>Kempia f. flavigaster</i>)	45	30	35	15	44

Date.	Name of Bird.	Across top.		Depth.		Height from ground.
		Outside.	Inside.	Outside.	Inside.	
		mm.	mm.	mm.	mm.	ft.
15/11/13	<i>Pæcilodryas cerviniventris</i> (<i>P. superciliosa</i> <i>cerviniventris</i>)	70	50	45	30	6
15/11/13	<i>Micræca pallida</i> (<i>M. fascians pallida</i>)	55	37	30	15	19
18/11/13	<i>Pæcilodryas cerviniventris</i> (<i>P. superciliosa</i> <i>cerviniventris</i>)	80	50	40	20	3
18/11/13	<i>Pæcilodryas cerviniventris</i> (<i>P. superciliosa</i> <i>cerviniventris</i>)	81	52	50	30	9
24/11/13	<i>Rhipidura albiscapa</i> (?)	45	37	40	20 (tail 85)	25
27/11/13	<i>Micræca pallida</i> (<i>M. fascians pallida</i>)	52	34	25	15	7
3/12/13	<i>Pachycephala pallida</i> (<i>Lewinornis rufiventris</i> <i>pallida</i>)	70	60	50	40	10
6/12/13	<i>Colluricincla brunnea</i> (<i>C. b. brunnea</i>)	145	80	120	55	5
11/12/13	<i>Colluricincla woodwardi</i>	180	90	60	50	*
27/12/13	<i>Malurus dulcis</i> (?) (<i>Leggeornis amabilis</i> <i>dulcis</i>)	80	45	120	90	†
6/1/14	<i>Myzomela pectoralis</i> (<i>Cissomela p. pectoralis</i>)	50	40	50	30	6
6/1/14	.. .. .	53	40	43	35	9
7/1/14	<i>Ptilotis unicolor</i> (<i>Stomiopera u. unicolor</i>)	80	55	75	50	12
12/1/14	<i>Malurus coronatus</i> (<i>Ryania melanocephala</i> <i>cruentata</i>)	120	50	150	50	5
15/1/14	<i>Amytornis woodwardi</i>	100	50	180	150	†
17/1/14	<i>Dicaeum hirundinaceum</i> (<i>Austrodicaeum</i> <i>hirundinaceum tormenti</i>)	60	40	80	55	10
17/1/14	<i>Dicaeum hirundinaceum</i> (<i>Austrodicaeum</i> <i>hirundinaceum tormenti</i>)	55	45	65	50	15

* In clefts of rock.

† In spinifex.

Descriptions of New Australian Birds' Eggs.

BY HENRY L. WHITE, R.A.O.U., BELLTREES, SCONE (N.S.W.)

(Published in "Bulletin No. 4" of the R.A.O.U., 16/4/14.)

Colluricincla woodwardi (Hartert). Brown-breasted Shrike-Thrush.

Mr. D. Le Souëf, R.A.O.U., described (*The Emu*, vol. viii., page 61) eggs, which are now in my collection, supposed to be those of this bird, and which were taken by Mr. H. G. Barnard, R.A.O.U., near Pine Creek, Northern Territory.

An interview with the first-named gentleman, and correspondence with the latter, convince me that an error of identification was made, and that the eggs described were most probably those of *C. brunnea*.

From several clutches of eggs, accompanied by skins of some of the parent birds, and a nest, I select the undermentioned sets for description as types of *C. woodwardi*.

Nest.—A cup-shaped structure, composed entirely of the reddish-brown roots of spinifex (*Triodia*), and usually placed in cracks or

holes in sandstone cliffs, with rocks overhanging. Measurements :—Outside diameter, 6 inches ; inside diameter, 3 inches ; outside depth, $2\frac{1}{2}$ inches ; inside depth, $1\frac{1}{2}$ inches.

Eggs.—Clutch, two to three, of the usual Shrike-Thrush shape ; texture of shell smooth and glossy ; ground colour, pure pearly-white ; the markings, of brownish-black, brown, and slate-grey, are mostly large and sparingly distributed, principally about the larger end.

The eggs of this species may be readily separated from others of the same family by the lesser number and (usually) larger size of the marks.

Measurements in inches :—No. 1 clutch, (a) $1.15 \times .8$, (b) $1.12 \times .8$, (c) $1.17 \times .82$; No. 2, (a) $1.14 \times .81$, (b) $1.14 \times .8$, (c) $1.05 \times .75$.

Locality.—Borrooloola, Macarthur River, Gulf of Carpentaria, Northern Territory. Taken by H. G. Barnard, 31st December, 1913.

Amytornis woodwardi (Hartert). White-breasted Grass-Wren.

During Mr. H. G. Barnard's recent collecting trip to the Macarthur River he was successful in securing two clutches of these long-sought-for eggs.

As will be seen from his notes to *The Emu* (vol. xiii., p. 188), the quest was not a simple affair.

Curiously enough, clutch No. 1 contained an egg of the Square-tailed Cuckoo (or *Cacomantis dumetorum* of Gould), while No. 2 consisted of two addled eggs and a newly hatched bird (*Amytornis*). The full clutch would therefore appear to consist of three eggs.

Nest.—A bulky dome-shaped structure (in shape much like a Finch's), composed of the dry seed-stems of spinifex and dry stringy-bark (eucalypt) leaves, lined with soft dead leaves of spinifex, the whole structure being well bedded into the top of a bunch of spinifex.

Eggs.—No 1 clutch, very full roundish ovals ; No. 2, more elongated ; shell close-grained, smooth and glossy ; ground colour, white with faint pinkish shade, markings, scattered all over the surface, but more numerous at the larger end, being of brownish-red and mauve.

Measurements in inches :—No. 1 (a) $.76 \times .63$, (b) $.78 \times .63$; No. 2 (a) $.82 \times .6$, (b) $.83 \times .6$.

Locality.—Borrooloola, Macarthur River, Gulf of Carpentaria, Northern Territory. Collected by H. G. Barnard, 15th January, 1914, and 28th January, 1914, respectively.

Falcunculus whitei (Campbell). Yellow Shrike-Tit.

Mr. A. J. Campbell (*Emu*, vol. x., p. 167) named the bird from skins taken in North-West Australia, and has identified as the same species skins collected by Mr. H. G. Barnard on the Macarthur River, N.T. A stroke of good fortune came my way when Mr. Barnard forwarded a pair of eggs. Our Eastern species

(*F. frontatus*) is not easy to obtain, while the Western form (*F. leucogaster*) baffled me for many years; therefore I had small hope of ever securing the eggs of my namesake.

Nest.—Placed in the topmost twigs of a tall stringy-bark (eucalypt) sapling. It is deep and cup-shaped, constructed of shreds of stringy-bark held together with cobwebs; lined with very fine stringy-bark and grass. Outside measurements:—Depth, 4 inches; width, 3 inches; inside depth, $1\frac{1}{2}$ inches; width, $1\frac{3}{4}$ inches.

Eggs.—Clutch, two; shape round oval; texture of shell, colour, and markings similar to those of the Southern bird, but size smaller. Measurements in inches:—(a) .82 x .64, (b) .8 x .62.

A single egg, forming another clutch, appears to be of abnormal shape, and measures .87 x .6.

Locality.—Taken by H. G. Barnard at Borrooloola, Macarthur River, Gulf of Carpentaria, Northern Territory, 22nd January, 1914.

Malurus coronatus (*M. c. macgillivrayi*, Mathews). Mauve-crowned Wren.

Although eggs of the North-West bird, *Malurus coronatus*, have been in my collection for years, I hesitated to describe them, being under the impression that someone had already done so. A search reveals no prior description, and of our two principal local authorities, Mr. A. J. Campbell states "Eggs undescribed," while Mr. A. J. North apparently ignores the species altogether. Why he does so is a mystery. For these reasons I feel justified in giving a description of the eggs of Mr. Mathews' new sub-species.

Along with two clutches of eggs (both of which contained an egg of the Cuckoo, *Cacomantis dumetorum*, Gould), Mr. H. G. Barnard forwarded a fine series of skins, the colouration of the crown of the full-plumaged male being of a distinct shade to that of the North-West form; in my opinion Mr. Mathews was justified in separating the two. See also previous remarks by Messrs. Campbell and Kershaw in *Emu*, vol. xii., p. 274.

Nest.—A bulky structure, composed of strips of paper-bark and blades of cane-grass, lined with fine grass-roots; the opening, at the side, near the top, has a platform of grass built out under it for a distance of about 3 inches.

Eggs.—Clutch, three; stout ovals in shape; texture of shell close-grained and without gloss. Ground colour, pinkish-white, marked all over, but principally at the larger end, with ill-defined spots and splashes of dark brownish-pink. Measurements in inches:—(a) .66 x .51, (b) .66 x .49, (c) .62 x .54.

Locality.—Collected by H. G. Barnard at Borrooloola, Macarthur River, Gulf of Carpentaria, Northern Territory, 12th January, 1914.

Three New Sub-Species of Birds.

BY GREGORY M. MATHEWS, F.R.S. (Ed.)

WHILE looking through the collection of skins in the possession of Mr. H. L. White, I noted the following new forms. The page number refers to my new "List of the Birds of Australia."

P. 182.—***Eopsaltria australis austina*.**

Differs from *E. a. australis* in having the head and back grey, the latter altogether lacking the greenish tinge; the under surface is very much paler.

Type.—Cobbora (Talbaagah River), New South Wales.

P. 215.—***Acanthiza nana dorotheæ*.**

Differs from *A. n. nana* in being much yellower on the under surface and lighter above. It is also longer in the wing.

Type.—Lithgow, New South Wales.

P. 219.—***Geobasileus reguloides tarana*.**

Differs from *G. r. reguloides* in having a light, not dark, buff rump. It is also lighter above.

Type.—Tarana, New South Wales.

Need for Bird Protection.

BY THOMAS N. STEPHENS (ADELAIDE).

ALLOW me to direct attention to two articles in the *Nineteenth Century* for February, 1914, on which these remarks are based, but every sentence of both articles is well worth reading. This subject, in the words of an American senator, is one "that ought to command the co-operation and support of every man in public life," and so strong has been that support in the United States that last year two measures of vast importance were swept through Congress on an irresistible tidal wave of insistent public sentiment. The first produced the Federal law protecting all migratory birds; the second freed the United States for ever from the shame and the horrors of the millinery trade in wild birds' plumage.

Among the world's 2,442 species of game birds the slaughter is enormous. Some idea of the extent may be obtained from the one fact alone that in October last 1,174 lots were offered at auction in London in one day. The "trade" said—"Let America refuse them; it will not save the birds or interfere with sales; we will still sell." But what was the result of that one day's sale? About one-third—368 lots—were withdrawn, owing to the action of the States, the lack of buyers, and the tremendous decline in prices. These withdrawn lots, the chief products of millinery slaughter, comprised nearly 90,000 skins, and, in addition, 2,494 ounces of Egret plumes, representing 14,964 birds. Among others there were 34,000 wing and tail feathers of the Hawk, 22,000 skins of Kingfishers, 17,000 wing and tail feathers

of the Condor, 3,000 skins of Golden and other Pheasants, 3,000 skins of Terns (White Sea-Swallows), 1,300 skins of Birds-of-Paradise, 2,000 skins of Cockatoos and Parrots, about 2,000 wing and tail feathers of the Eagle, and, among many others, including skins of Pelican, Marabou Stork, Scarlet Ibis, Gulls, Owls, and Macaws, were 761 skins of the Emu. Multiply these 90,000 odd by three, and it is said the result would be a fair approximation of the product of the world-wide slaughter offered for sale in London on one day. During one month, before the American market was closed, 4,500 skins of those lovely Greater and Lesser Birds-of-Paradise were imported into New York. Nothing more striking can show the necessity for immediate Federal action, following the bold and humane precedent established by our American cousins, for not only is the slaughter world-wide, but Australia will probably be among the countries deluged with this plumage obtained for the adornment of Nature's already "fair sex." But let us hope, as Lord Lilford said, that the day will soon dawn when no women in civilized and law-abiding countries will be allowed to disfigure their heads with the plumage of wild birds, and when that day does come this horrible traffic will cease.

Give women the right to vote, by all means. The world would be no worse—probably better—if they had it everywhere; but it is not too much to ask that they, in turn, will help to give God's beautiful winged creatures the right simply to live and continue to charm us by their form and plumage and delight us with their grace and freedom. It is largely a woman's question, and could be quickly decided if only women would decline to wear pieces of dead birds in their hats. The comparatively few men who get their living by the vile massacre are not worth considering. It would be an insult to women even to suggest that their remarkable ingenuity in personal adornment cannot devise something to take the place of wild birds, which, alive, appeal to us all, if only by their mere helplessness. But, as in America, where reform was possible only by the growth of public opinion voiced by no fewer than 130 newspapers and magazines, so in Australia the subject, I am sure, has only to be ceaselessly ventilated and similarly supported to bring the matter to a successful issue. I know that these remarks appeal to willing ears, for the press has already used its strong influence in support of the movement, and, I hope, will continue to do so on every possible occasion.

Various State Governments have done something towards preserving bird-life in Australia. South Australia, for instance, under the *Birds Protection Act* 1900, protects wholly all the year round, on public or private property, 41 species, and some others during the breeding season. But the wider question of importation is a Federal matter. The *Customs Act* provides that no prohibited goods may be imported, and that goods specified in a Governor-General's proclamation are prohibited imports. Acting under this, a revised proclamation was issued in May,

1913, prohibiting the importation into the Commonwealth of the plumage and skins of certain birds, viz. :—

Birds-of-Paradise.

Humming-Birds.

Monal, or any one of the species of Asiatic Pheasants, such as the Impeyan Pheasant.

Argus, or any one of the species of Asiatic Pheasant, such as the Argus Pheasant.

Crowned Pigeon, or any of the species of large-crested Pigeons of New Guinea and adjacent islands.

Owls.

Kingfishers.

Macaws; any Parrot of the genus *Ara*, *Sittace*, or *Macrocerus*.
Stork tribe.

Heron tribe (including the Egret, from which is obtained plumes commonly known as "Ospreys").

Ibises and Spoonbills.

Todies.

Cock-of-the-Rock, and the

Quezal, or Resplendent Trogon.

Traders who import and travellers or other persons who bring any of these into Australia will find trouble, for the Customs will rigorously enforce the law, which is certainly good as far as it goes. What is needed, however, is the more drastic action of the United States. A large and increasing quantity of feathers, other than those prohibited, is received into South Australia—£4,000, £7,000, and £10,000 worth of dressed feathers during the past three years respectively—and this does not include either feathers used in imported millinery or undressed feathers, of which latter, however, there are few. The imports into the whole Commonwealth are also heavy, and show a remarkable increase. The value of dressed feathers rose from £45,619 in 1911 to £85,983 in 1912, and those undressed from £5,096 to £6,281—that is, £92,000 worth in one year, more than half from the United Kingdom and £37,000 worth from France and Germany. Think for a moment what merciless destruction of beautiful, free, wild birds this alone represents, and then say whether you, as an individual, intend to do your little best to continue it or to prevent it.

Stray Feathers.

Birds at Lighthouse.—The following record of birds that struck the Goose Island Lighthouse was forwarded by the Secretary of the Marine Board of Hobart, Tasmania :—" 25th July, 11.35 p.m., Sandpiper; 7th August, 12.15 a.m., bird not seen; 27th August, 2.35 a.m., Starling; 5th September, 1.5 a.m., bird not seen; 12th September, 3.55 a.m. Dusky Robin, 4.40 a.m. Fantail; 28th October, 10.30 p.m., Storm-Petrel; 29th October, 10.50 p.m., Storm-Petrel."

Food of the Yellow-bellied Shrike-Tit (No. 422, *Falcunculus frontatus*, Latham).—Recently, the pleasant, self-satisfied two-syllable note of some Yellow-bellied Shrike-Tits directed my attention to a wattle tree, and, on glancing upwards, I observed a pair of these dainty birds busily engaged devouring cotton scale, which infested the wattle tree, and was slowly destroying it. The birds worked from the outer twigs along the branches inwards to the main trunk of the tree, and cleaned off the scale in a workmanlike manner, uttering as they proceeded along the boughs notes of pleasure, and raising and lowering their large crests. For two days I observed "Nature's tree-sprayers," and estimated that the work performed daily by each bird, when compared to that of a man, was worth to the community at least 9d. Approximately, the value of the work performed by each Yellow-bellied Shrike-Tit is £14 per annum to the Commonwealth.—A. H. E. MATTINGLEY. Victoria, June, 1914.

* * *

Tameness of Native Birds.—A lady member in Tasmania writes:—"I amuse myself watching the birds a great deal. The Wrens (*Malurus*), ten of them, will come to within 4 feet of my couch on the verandah, and pick up crumbs. They are in sombre plumage, with the exception of two, whose tails are becoming blue. My Wrens scold each other, and hunt round the plants and grass. A Scarlet-breast (Robin) comes and perches on a bamboo blind at my head, about 5 feet away. He catches flies. The Silver-eyes (*Zosterops*) spend their time on the cherry trees, about 10 feet away. A Crescent Honey-eater has been coming for several days to a delphinium flower about 6 feet from me. It seems to live hereabouts, and I often hear its shrill call. Our half-tame Whistling Shrike-Thrushes come and perch near. They will take meat a foot distant from my head, and I hope that they will feed from my hand before long. The female Thrush is the tamest. She has a white feather in her plumage. She remains with a piece of meat in her bill for about ten seconds, and watches me; then she flies up to her 'cupboard,' a crack in the roof of the wood-shed, where she stores the meat, and tears it to pieces. Sometimes a Butcher-Bird comes along and examines the 'cupboard,' knowing that the Thrushes often leave food there. If they are hungry the Thrushes will come on to the tank and give a loud call, clacking their beaks together. The Dusky Flycatchers (*Rhipidura*) fly round the wood-shed, where they capture many flies. They are also fond of a big ivy-laden stump, where they spend hours feeding, flying, and chattering. I saw a Yellow-throated Honey-eater (*Ptilotis*) on it yesterday, and a Wattle-Bird previously. One day a Green Parrot (*Platycercus*) sat on the pine and called 'Tussock' for about a quarter of an hour."

* * *

Peculiar Actions of *Leipoa ocellata*.—In October, 1913, I visited a tract of mallee scrub some 30 miles distant from my

school, with the intention of collecting from about three mounds of *Leipoa ocellata*, and then devoting my time to general collecting. But I am pleased to say that my time was nearly all occupied in watching what I consider to be a peculiar action of a Mallee-Fowl. One morning I walked through dense mallee in search of a mound. I must have been searching for nearly half an hour before I was rewarded by finding a mound, from which a bird hurriedly departed. (I had been informed that I would not see a bird near the mound.) I examined the mound and found that it was very much damaged. I walked about 30 yards away, to a spot where I could see without being seen from the mound, and waited for over two hours, reading and preparing specimens. My wait was successful, for at length I saw a bird walking near the mound. It went to the other side, and after some minutes began working—dust was flying. I waited some time, and then decided to work round and catch a glimpse of the bird. I was complimenting myself on having succeeded, when “snap!”—I had trodden on a dry stick, and, needless to say, the bird had vanished. An examination showed that more of the mound had been scratched down. I visited the mound again next morning, and, to my surprise, found that it was practically a ruin. All of the north side had been broken down, and the material scattered about. Four fresh eggs lay amid the ruins. I searched for marks of a fox, but could find none. Scratchings similar to those made by the Mallee-Fowl could be plainly seen. I am of opinion that the bird had something to do with the wrecking of the mound, but would like to have the views of other observers on the subject. Mallee-Fowl are very numerous in the new country. I also had the pleasure of seeing large numbers of Bronze-winged Pigeons (*Phaps chalcoptera*).—REG. L. WALTON, R.A.O.U. Boigbeat (Vic.)

* * *

A Friendly Coachwhip-Bird.—Those who are familiar with the Coachwhip-Bird (*Psophodes crepitans*) know that it is oftener heard than seen, and that fact is borne out by my six years' experience on Ellerslie, a homestead not much more than two miles from Drouin. Throughout the period the bird may have been observed a score of times, but my area of observation lies within very narrow limits, being confined to an adjacent gully, Gumscrub Creek, and Tarago River. The latter stream is remarkable for its meandering course. I can record only two instances of meeting with Coachwhip-Birds on hilly ground, a single individual being seen in each case. Gumscrub Creek was formerly a rushy morass, of considerable breadth in some places. Of late years, though a drain has been cut, the slopes on both sides of its course through Ellerslie, as far as scrubs are concerned, may be described as jungle. I have often rambled along the fern-tangled inclines without hearing the birds call, but that is no evidence that they were not among the bracken. According to my experience, with rare exceptions, the bird betrays its presence only by its whip-like notes, which competent authorities inform us are produced

by the male and female joining their voices together in such a manner that they seem to be uttered by one bird. At that rate, a pair claims ownership of the top end of the creeklet, where it enters this estate. Crossing the swamp at that point, the calls have been heard often enough in the dense covers which terminate at the upper boundary of the property. Once a Coachwhip-Bird was seen prancing along a fallen tree whose bole was bare of bark and had a mat of bracken on both sides. I studied the bird's capers. It seemed to be a born dandy, dominated by self-esteem. With partially elevated tail, and crest perked up, it bounded along the log until it reached a splinter, which it endeavoured to displace. Failing, it retreated a little distance, returned, and, putting in a supreme effort, met with success. The next procedure was to search for food. Not finding any, the bird took refuge in his ferny bower. My first view of this scrub denizen was obtained in the orchard in winter—it must be remembered that fruit trees were leafless. This bird, without being really shy, proved extremely restless; it visited one apple-tree, then another, and never alighted upon the ground.

On 6th March, 1914, my sister informed me that a bird never previously observed was in the garden. On my going to the front verandah the newcomer was seen, and instantly recognized. A variety of flowering plants abut upon the verandah, which runs all round the house. Apparently the bird was at home. It was surprising to me that a timid bird such as the Coachwhip seems to be should prove so tame. This bird was fearless in the presence of human beings. A close approach did not alarm it in the slightest degree. Of course, I avoided movements of an alarming nature; but the bird did not heed footsteps on the verandah floor, though when a loose board slipped down with a clatter it instantly darted into cover. With rare exceptions, it was seen at all hours prospecting busily around the house, generally under the shrubbery, until 11th March, when it finally disappeared. My impression was that it had gone to a more suitable location, but this conjecture was wide of the mark, for later my sister discovered the bird drowned in an underground tank. This tank, though planked over, has openings, through one of which the bird had entered either for a drink or to make an inspection. Evidently this mishap occurred on the 11th, because at 11 a.m. it came to drink water from a shallow pie-dish placed in the shade for our pet Magpies. On the previous day it was not visible till 2 p.m., when it bounded briskly along the verandah, straight for the dish, and slaked its thirst in a rapid, jerky manner. Once, while drinking, it lost its hold on the vessel's rim, and slipped into the water. The mischance did not trouble the bird. Regaining the rim, it once more proceeded to refresh itself. On one occasion both passage doors standing wide open, the bird pranced through the hallway, which is 46 feet in length. Another day I was standing on the garden path when the Coachwhip-Bird passed barely 6 inches from my feet.

Although narrowly watched, it was never seen to walk or run; its mode of progression was confined to hops of greater or less rapidity. As a rule, it fed beneath cover, save of an evening, between two lights, when it was observed upon an open space near a large clump of rosemary, into which it sped when I passed. It was constantly seen on the move, but presumably took spells where it was screened from view. Occasionally it showed off, spreading its tail. I believe that it was young, because the cheek-markings, instead of being white, were greyish-white. When the bird arrived we were having a spell of dry weather, strong sun-heat, and locally some small bush-fires. These causes combined may account for the bird's visit.—ISAAC BATEY, R.A.O.U.

* * *

Tasmanian Spotless Crake.—At Christmastide the Misses Fletcher, Springfield, Tasmania, were good enough to show me a series of eggs belonging to this Crake. The specimens were considerably larger and different from those of the mainland bird. Miss J. A. Fletcher, R.A.O.U., has since kindly sent a skin for identification which is larger and darker coloured (head almost black) compared with birds in the National Museum, Melbourne, taken in Victoria. As I was aware that Mr. H. L. White, R.A.O.U., Belltrees, New South Wales, possessed more material, I submitted the skin to him. The following is his reply:—

“If one looks for sub-specific differences I should say that the birds may be separated. The comparative measurements are:—

		Wing.		Tarsus.		Bill.		Longest Toe.
Tasmania	...	90 mm.	...	32 mm.	...	19 mm.	...	27 mm.
New South Wales	82	”	...	30	”	18	”	22
Western Australia	88	”	...	31	”	20	”	28

“In colouration Tasmania is the darkest, then come New South Wales and Western Australia, in that order.”

The wing measurements of the two birds in the National Museum are each 84 mm.

General description of the Tasmanian bird:—Under surface dark neutral grey, lighter on the throat, and blending into an almost black head. Upper surface dark chestnut.

Should it be found when more material is examined that the insular bird is constantly different from the mainland one, the former locality being that of Gould's *Porzana immaculata*, according to Gregory Mathews (“Birds of Australia,” vol. i, p. 217), then he will have to provide a sub-specific name for the mainland form.—A. J. CAMPBELL.

* * *

Lyre-Birds and the Camera.—In August, 1913, Mr. D. Le Souëf, C.M.Z.S., and Dr. G. Horne, of Melbourne, journeyed to Poowong (Vic.), equipped with good cameras, to take photographs of the Victoria Lyre-Bird (*Menura victoriae*) in its native haunts.

The weather was wet, and though the rain did not daunt the enthusiasts in the least, it nevertheless affected their photography. Mr. Le Souëf took two photographs of the female bird (from about 12 or 15 feet) near her nest, but the light was too unfavourable for success. Photographs of the nests were taken during the short periods of sunshine, but much of the time was spent close to a fire in the dense scrub. The female bird fed and scratched within a few feet of us all the time, and even followed in our footsteps when we moved away. We also had some mimicry from the male bird. On 31st August, 1913, Mr. Charles Barrett and Mr. G. Finlay, of the Bird Observers' Club, made the same trip, under particularly trying conditions, for it rained most of the day. But it is on just such days that the male Lyre-Bird is at his best with mimicry. On this occasion one fairly excelled himself, for in addition to the usual imitation of birds, it favoured us with the bark of a cattle dog, repeated 20 or 30 times, and also the whistle of the man calling the dog off. Its sense of modulation was perfect, and altogether a revelation. We found a Satin-Bird's (*Ptilonorhynchus holosericeus*) bower containing many playthings, such as birds' skull, pieces of blue glass, coloured feathers, many flower bells, and different leaves and straws. Notwithstanding the unfavourable weather, some creditable camera work was accomplished under great difficulties. The female bird was very tame, and offered every chance, even allowing Mr. Barrett to unpack and set up his camera within 9 feet of where she was perching. She followed us about the scrub as before, and while we were at dinner a beautiful male, in full plumage, slowly strutted in a complete circle around us. Refusing to be intimidated by the fire and smoke, he passed within 20 feet of us, and was on view for perhaps three minutes. On 13th September, 1913, Mr. L. G. Chandler visited the same locality, and on this occasion the Fates were indeed kind, for the day proved to be of the kind that a photographer gladly welcomes. While still far from the scrub we could hear the crack of the Coach-whip-Bird and occasional outbursts from the Lyre-Bird. We proceeded straight to the nest, and the female immediately appeared, and for awhile we studied and admired her, Mr. Chandler with much astonishment at her tameness. About a chain away from the nest there was a broken fern stump about 5 feet high, but leaning gracefully, and relieved by lichens and "ladies' finger," staghorn, and other ferns, and forming a perfect bush pedestal. "Now, Mr. Chandler," I said, "if you will focus on the top of this fern stump at the distance you prefer for a perfect photograph, I think that I can induce her to perch on it and remain long enough for an exposure." Mr. Chandler hesitated, thinking it a joke, but, finding that I was in earnest, did as requested, and then concealed himself under some dead fronds of a tree fern about 4 feet from the pedestal, and with the bulb release at the end of a length of rubber tubing in his hand to operate the camera shutter. On previous visits I had noted that if the bird lost sight of us for an

instant when following us, she *invariably* sprang up on to some stump or tree nearest to hand, and it had occurred to me that we could gain advantage from this habit. I had not explained all this to Mr. Chandler, hence his hesitation. When all was ready I went to the nest to make the young bird call, and when the female appeared proceeded slowly right between the camera and the stump (fern), the bird following in my footsteps, about 12 paces behind. When she was between the camera and the stump I stopped, and she followed suit. Presently, as was her usual habit, she began scratching and raking for food. Directly her eye was off me I lay down, and when she looked up and missed me she sprang up to the nearest resting-place from which to get a better view—namely, the bush pedestal. Mr. Chandler pressed the bulb and the photograph was taken. If only I could have had a snap of Mr. Chandler's own surprised and delighted face when he emerged from his cover, my happiness would have been complete. We took a number of photographs, each from a chosen spot. In one case I had just scratched the bird's head with my stick. While I was doing that later on she took the end of the stick in her claws and contemptuously threw it aside. Photographs of Lyre-Birds' nests were taken, some of them in the state to which the birds nearly always reduce them after a season or two, if they are near or on the ground, probably in searching for food, for the decaying sticks and leaves offer shelter for grubs and so forth. The lining of the old nests is frequently used for new nests. We noted that the female bird did not sit in the nest at night with her young, though the latter was not three weeks old. This fact, I think, is not generally known.—L. C. COOK. Poowong, Victoria.

From Magazines, &c.

Ornithological Journal.—The second number (April, 1914) of the new quarterly magazine, *The South Australian Ornithologist*, has been issued. It contains four important "Additions to a List of the Birds of Australia," by Gregory M. Mathews, F.R.S.E.—a new species of Owl, *Tyto galei*, an entirely new genus allied to *Zosterops*, *Macgillivrayornis claudi*, and two new sub-species of Finches, named respectively *Ægitha temporalis macgillivrayi* and *Neochmia phæton albiventer*. The habitats are given as the Pascoe and Claude Rivers, Northern Queensland. These discoveries were made by two members of the R.A.O.U.—Dr. Wm. Macgillivray, Broken Hill, and Mr. J. A. Kershaw, F.E.S., National Museum, Melbourne, to whom credit is due. Their field-notes will appear later in *The Emu*. Mr. Mathews also contributes an interesting historical "Note on *Platycercus hæmatogaster*, Gould," while there are other popular field-notes on different birds by local subscribers.

Habits of the Kea.—The following is published in the *Lyttelton Times* (N.Z.) of 14th March, 1914, in the column entitled "In Touch with Nature," conducted by Mr. James Drummond, F.L.S., F.Z.S.:—"The quaint habits of Keas in their own realm are dealt with in a note from Mr. E. R. Waite, Curator of Canterbury Museum, who, while on a holiday visit to Mount Cook, in the middle of February, found time to make a few observations of these birds. At the Ball Hut, where he counted the unlucky thirteen, he was surprised at their confidence and their utter fearlessness. Later, when the members of the party became better acquainted with these mountaineers, an opinion was expressed that in bare-faced impudence they rivalled the notorious Weka. As soon as the visitors reached the hut Keas gathered about them, or assembled on the ridges of the building. From there they condescended to take pieces of food offered to them on the points of alpenstocks. As long as the visitors remained standing the birds kept at arm's length; but when the visitors sat down the birds lost all fear, and established terms of familiarity. Two, three, or more quarrelled for the gratification of trying to remove big nails from glacier boots or to untie the laces. One of the birds turned its attention to the dress worn by Miss Greenwell, a member of the party, and it was found that an action which was believed at the time to be dictated merely by innocent amusement had resulted in several holes being pecked in the fabric. Mr. Waite, by sitting on the ground watching for opportunities, had no difficulty in catching the birds by hand while they were absorbed in an inspection of his clothing. When released, they retired to a short distance, but they soon overcame their surprise and were once more in the grip of the spirit of inquisitiveness. This trait was demonstrated in other places besides the vicinity of the hut, as Mr. Waite caught a Kea at the top of a moraine overlooking the Hochstetter icefield. Black-backed Gulls were the only other birds seen as high as the Ball Hut. There were only two Gulls there, but as soon as the party set out on its tramp across the glacier one of them took wing, and it was seen sitting on a rock near the Malte Brun Hut, waiting the strangers' arrival there. Their guide told them that that particular individual usually treated visitors in that way. As if in corroboration of his statement, the Gull, on their return journey, passed over their heads, presumably after having devoured the edibles they had thrown away after they left the hut. Mr. Waite reports that the native Pipit—commonly, but wrongly, called the Native Lark—is often seen in the vicinity of the glaciers, but that the avifauna is mostly represented by the introduced Blackbirds, Larks, Chaffinches, and Yellowhammers."

Member Honoured.—Dr. J. A. Leach, co-editor of *The Emu*, and author of "An Australian Bird Book," has been elected a Colonial Member of the British Ornithologists' Union.

Review.

["Antarctic Penguins." By Dr. G. Murray Levick, R.N. London: William Heinemann. (Through Geo. Robertson and Co. Pty. Ltd., Melbourne.)]

THIS volume on the "true inhabitants" of the Antarctic regions, by the zoologist of the British Antarctic Expedition, 1910-13, deserves the highest praise. It is a most important contribution to ornithological literature, and at the same time charmingly written. Even a person not specially interested in bird-life should be able to read "Antarctic Penguins" with pleasure. The author deals with the Adelie Penguin (*Pygoscelis adeliae*), giving the results of patient observations made chiefly at Cape Adare rookery, "a neck of land jutting out from the sheer and ice-bound foothills of South Victoria Land northwards for a distance of some twenty miles." The sides of the cape rise sheer from the sea. There is no foothold save at the extreme end, "where a low beach has been formed, nestling against the steep side of the cliff, which here rises almost perpendicularly to a height of over 1,000 feet." The first part of the book is devoted to an account of the arrival of the Penguins at Cape Adare, and what takes place during the fasting period. The first birds arrived on 13th October; on 16th October there were about twenty. The numbers continued to increase till the rookery was crowded. The nest-building is described, and the manner in which the Penguins quarrel and fight, and rob each other of nesting material (stones).

Part ii. deals with the domestic life of the Adelie Penguin, laying and incubation of the eggs, the bird's habits in the water, their games, care of the young, and the later development of the social system. Here is a sample of the author's quality:—

"As a band of spotless bathers returning to the rookery, their white breasts and black backs glistening with a fine metallic lustre in the sunlight, met a dirty and bedraggled party on its way out from the nesting ground, frequently both would stop, and the clean and dirty mingle together and chatter with one another for some minutes. If they were not speaking words in some language of their own, their whole appearance belied them, and as they stood, some in pairs, some in groups of three or more, chattering amicably together, it became evident that they were sociable animals, glad to meet one another, and; like many men, pleased with the excuse to forget for a while their duties at home, where their mates were waiting to be relieved for their own spell off the nests."

In an appendix, descriptions of the plumage and soft parts of *P. adeliae* and of some variations in plumage are given. There is a short chapter on M'Cormick's Skua Gull (*Megalestris mac-cormicki*) and a note on Emperor Penguins (*Aptenodytes forsteri*). The illustrations are a notable feature of the volume; they are numerous and excellent.

The review of "A List of the Birds of Australia," by Gregory M. Mathews, F.R.S.E., is unavoidably held over.





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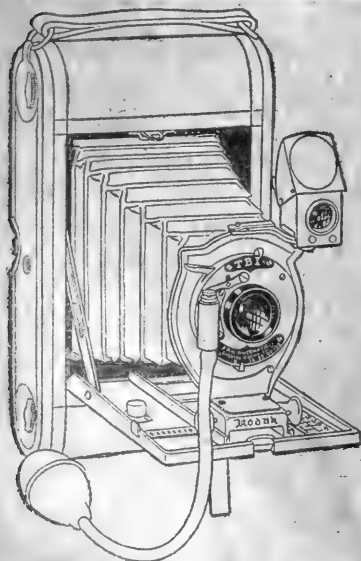
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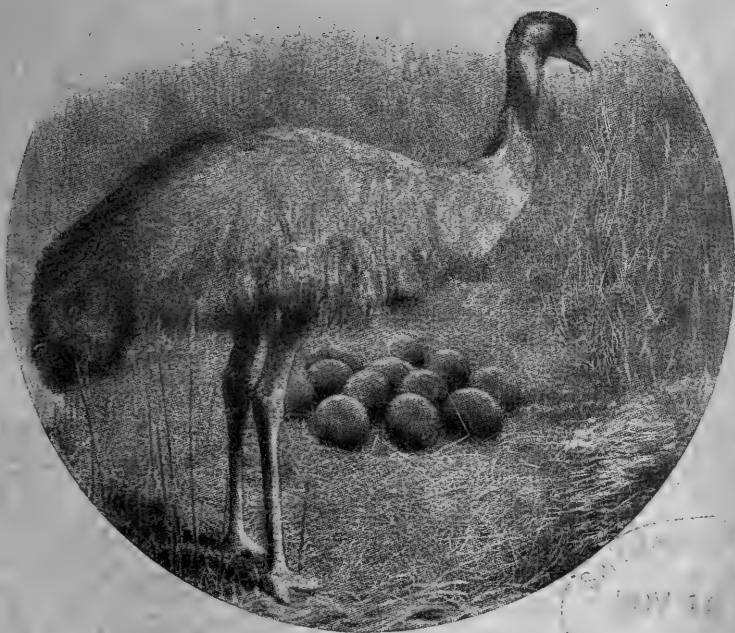
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[Part 2.]

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Official Organ of the ROYAL AUSTRALASIAN ORNITHOLOGISTS' UNION.



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"Birds of a feather."

VOL. XIV.]

1ST OCTOBER, 1914.

[PART 2.

Rarer Birds of the Mallee.

BY F. E. HOWE AND T. H. TREGELLAS.

(Read before the Bird Observers' Club of Victoria, 17th June, 1914.)

IN September, 1913, we journeyed by train to Ouyen (on the Mildura line), 298 miles from Melbourne, thence westward to Murrayville, 12 miles from the South Australian border. From here we went to the camp of the Government boring party, under the supervision of Mr. J. J. Scarce, situated some 42 miles north-west of Murrayville and within three miles of the border fence.

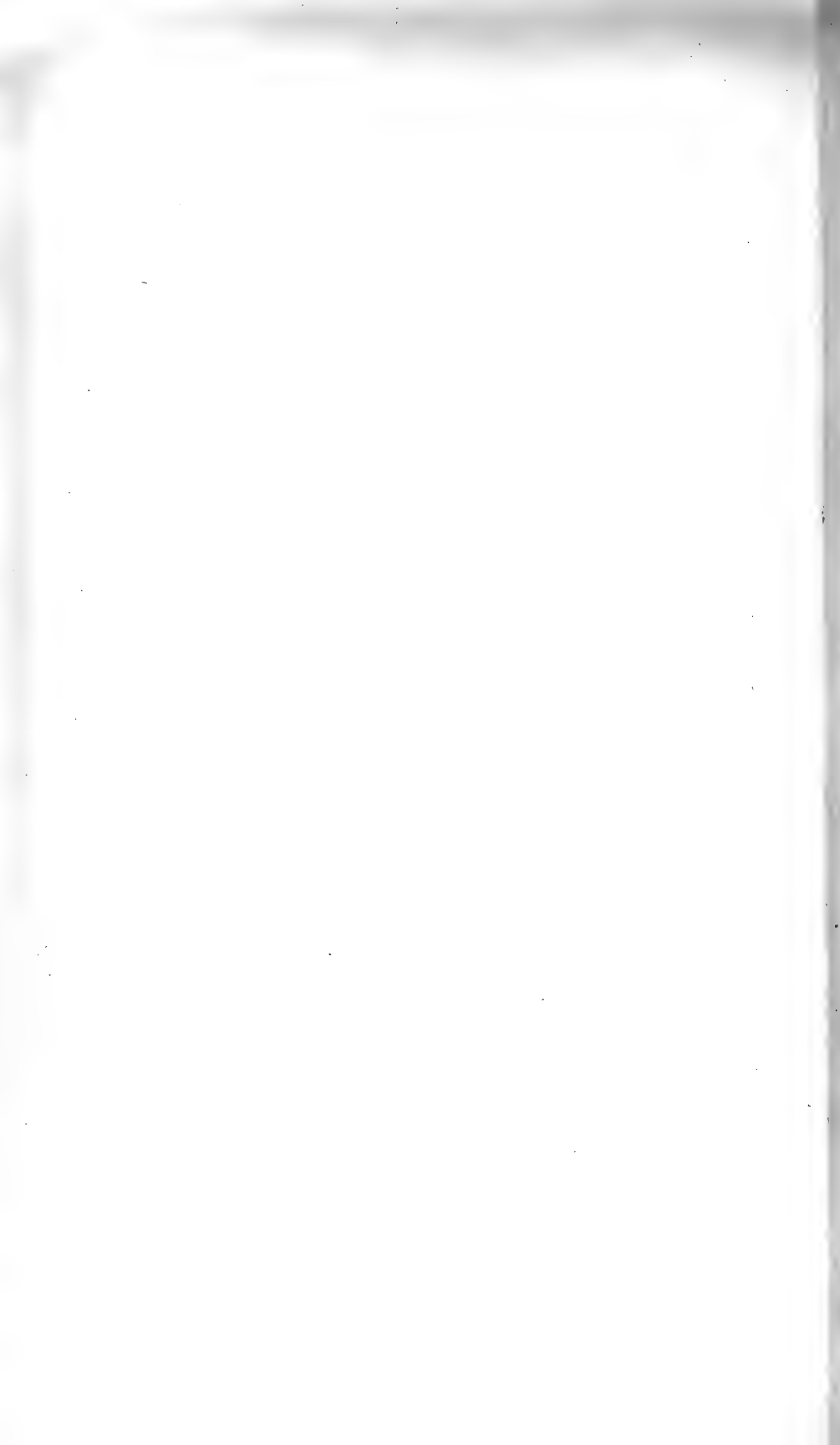
Our primary object was to obtain skins of the Night-Parrot (*Geopsittacus occidentalis*). It is supposed that this form is nearly extinct, but Mr. Scarce has met it twice, in different localities, some 70 miles apart—a few miles farther north than we reached in September, and again some 12 miles south of Kow Plains. In both instances the birds were in thick and large porcupine grass (*Triodia*), and were seen feeding out on the edges of the grass, in each case where the grass spreads out on to small plains. There were round burrows right through each clump, and Mr. Scarce supposed that these were made by the birds as a means of escape. We also desired skins and eggs of other rare species, particularly *Stipiturus*, *Strepera*, *Malurus*, *Drymodes*, *Hylacola*, and *Cinclosoma*.

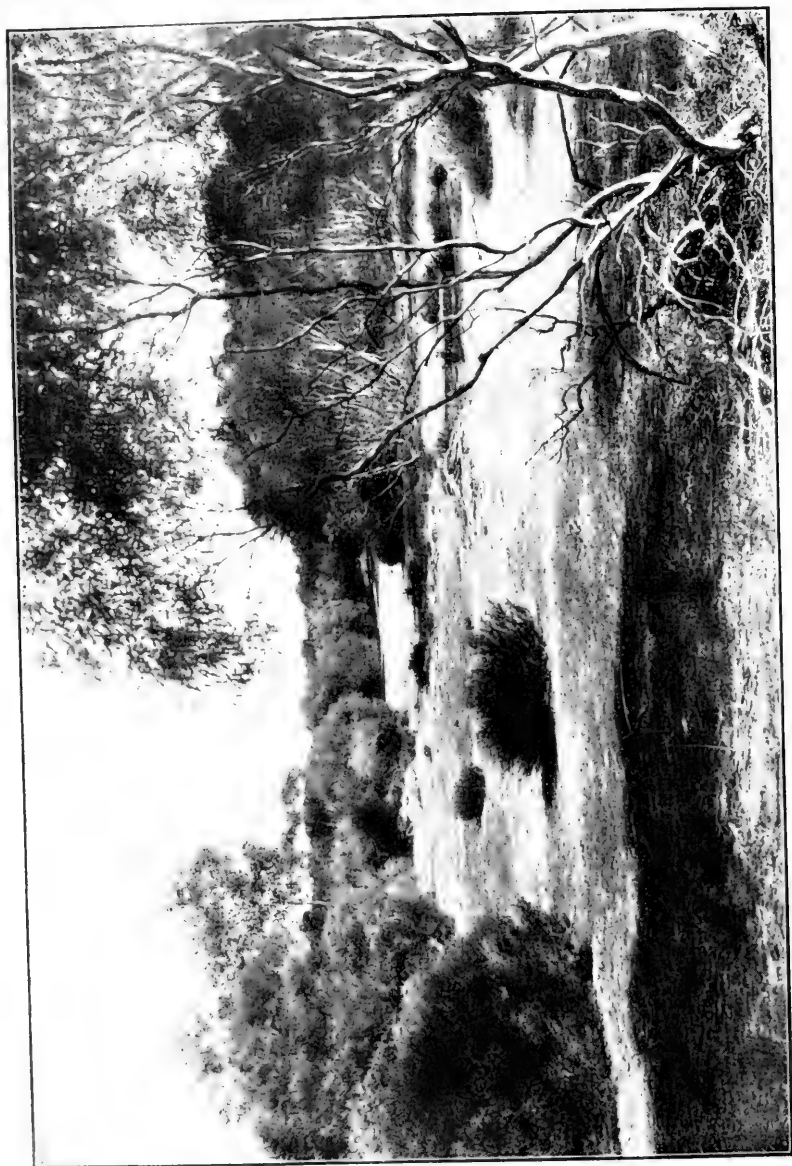
We left Melbourne on 12th September at 4.50 p.m., and arrived at Ouyen at about 4.30 a.m. next day. After a few hours' sleep and a meal we strolled into the scrub to the east of the township, and saw many birds, notably the Chestnut-backed Ground-Bird, *Cinclosoma castanotum* (*C. c. castanotum*), Black-backed Wren-Warbler, *Malurus melanotus* (*M. m. melanotus*), and Ring-necked Parrot, *Barnardius barnardi* (*B. b. barnardi*). In a small bush was found a nest containing one egg, nearly incubated, of the Short-billed Tree-Tit, *Smicrornis brevirostris* (*S. b. viridescens*). The long spell of dry weather prior to our trip into this country was, no doubt, the cause of many of the birds laying small clutches. This was especially the case with the Purple-gaped Honey-eater, *Ptilotis cratitia* (*Lichenostomus cratitius howei*), Black-winged Bell-Magpie, *Strepera melanoptera* (*S. m. howei*), Rufous-rumped Ground-Wren, *Hylacola cauta* (*H. c. brevicauda*), and Gilbert Whistler, *Pachycephala gilberti* (*Gilbertornis rufogularis rufogularis*). And the season was a late one for many species.

We left Ouyen at noon, and reached Murrayville at about 7.30 p.m. When Messrs. J. A. Ross and F. E. Howe were camped here in 1908 the place was known as No. 8 Bore, but now it is a flourishing township. Here we were met by Mr. Scarce, our voluntary guide on all our trips. He intimated that we had better have tea at once, as we were to drive out some 10 miles. The meal over, we packed our impedimenta and ourselves into a buggy and drove to the residence of a Mr. Sporn, where we spent the night. After breakfast next day we drove on to the farm of Mr. W. Ribbons. The people in this locality are famed for their hospitality, and, though the day was young, we had to wait and partake of tea, white bread, and beautiful cream. Meanwhile, our luggage was transferred to a cart and sent on an hour ahead of us, as we had a long trip to do, and the roads, where not grubbed, are heavy. Bidding this large and happy family adieu, we again took to the track. Mr. Ribbons drove the three of us in his buggy as far as the road permitted. Catching up to the cart, we dined at a bore. From here the buggy returned, and we were left with a 10-mile walk before us. As we could not afford to spend much time in the scrub, we kept mostly to the road, going into the scrub only when some rare bird called or the bush looked particularly "good." The character of the country altered very little, and, generally speaking, consisted of short mallee timber, with here and there turpentine or small tea-tree flats, the usual sand-ridge running east and west, and, occasionally, a limestone ridge. The bush was beautiful this morning, all the shrubs being in bloom; the mallee itself was mostly in blossom. Honey-eating birds called on every side, and we identified many Honey-eaters, including the Purple-gaped, *Ptilotis cratitia* (*Lichenostomus c. howei*), the Yellow-plumed, *Ptilotis ornata* (*Lichenostomus o. tailemi*), Tawny-crowned, *Glyciphila fulvifrons* (*G. melanops chandleri*), White-fronted, *G. albifrons* (*G. a. incerta*), and the Black-eared Miner, *Myzantha melanotis* (*M. flavigula melanotis*), all feeding on the flowering tea-tree. On every sand-ridge the Gilbert Whistler, *Pachycephala gilberti* (*Gilbertornis rufogularis rufogularis*), Purple-backed Wren-Warbler, *Malurus assimilis* (*Leggeornis lamberti assimilis*), and Yellow-rumped Pardalote, *Pardalotus xanthopygius* (*Pardalotus punctatus xanthopygius*), were seen. Whenever we passed a tea-tree flat, the call-note of the Scrub-Robin, *Drymodes brunneopygius* (*Drymodes b. victoriae*), was heard. Walking through some porcupine grass (false spinifex, *Triodia*), we flushed a Striated Grass-Wren, *Amytornis striata* (*Mytisa striata howei*), from a nest containing two young, a few days old. This was the only nest of this rare species that was seen on the trip, and, although the birds were very plentiful all through the porcupine country, they were so shy that we were unable to obtain specimens. After we had crossed a tea-tree flat a male Scrub-Robin attracted us by its excited manner, and much time was spent in looking for the nest. Giving it up, we walked on, but after going about 50 yards



Nest of White-fronted Honey-eater (*Glyciphila albifrons*).





A Typical Tea-tree Flat, Mallee District (Victoria).

FROM A PHOTO. BY T. M. TREGELLAS.

we flushed the female bird from the nest, which was placed flat on the ground, in the centre of a small mallee bush, and contained one fresh egg—a full clutch. Mr. Scarce piloted us to an old camp of his, where, a month previous, he had noticed a pair of Pardalotes burrowing, and from the nest a full clutch of four fresh eggs was taken. This spot is known as Bolton's Crab-hole, in honour of a surveyor who found it in 1845. Water is of such importance in this country that any little catchment is looked upon as very valuable. Among some whipstick mallee we saw two young Chestnut-backed Ground-Birds, fully fledged and running with the parents. A young one was caught and examined, and the excited parents, running about us, looked very beautiful, especially the male, in nuptial plumage and showing the chestnut saddle on the back to advantage. Specimens of *Pardalotus*, *Pachycephala*, and *Cinclosoma* were collected *en route*. At 6.30 p.m. we came in sight of our camp, consisting of six tents, one of which had been erected for the "bird men." After tea, Mr. Tregellas skinned his three birds, the Spotted Nightjar, *Eurostopodus guttatus* (*Eurostopodus argus argus*), serenading him the while.

We were early astir on 15th September, and found that light rain had fallen through the night—just enough to make everything look beautiful and distil perfume from flowers. Crested Bell-Birds, Black-backed Magpies, Grey Thrushes, Collared Butcher-Birds, and Honey-eaters were singing around the tents. After breakfast, provided with lunch and full water-bags, we shouldered our guns and set out for a day in the scrub. We were in the wilderness, many miles north of the nearest selection. Sand and short mallee were everywhere. There was no big timber, and, consequently, no Parrots or Cockatoos. Close to our camp was a tea-tree flat, estimated to be about 10 acres in area and to shelter fully 30 pairs of Scrub-Robins, as well as many other rare forms. Beyond the flat lay some good porcupine-grass country, where Mr. Scarce had located Striated Grass-Wrens and Emu-Wrens, *Stipiturus mallee* (*S. malachurus mallee*). This bit of country, which we "worked" well during the next few days, showed a succession of sand-ridges covered with dense porcupine, short mallee, and tea-tree. The Tawny-crowned, White-fronted, Mallee, White-eared, and Purple-gaped Honey-eaters were very plentiful here, and two nests of the last species, each containing one egg, well incubated, were noticed. A nest of the Scrub-Robin, ready for the egg, was found, but it was subsequently deserted. Here we located the Emu-Wrens, and, loading the guns with light dust-shot cartridges, we removed our boots and followed the birds about the sand-ridge, but without getting a shot. These birds, with great rapidity, dart from one clump of porcupine right through adjacent clumps, and in a few seconds are a hundred yards away, and, of course, out of hearing. It is then difficult to hear the call-note again, which resembles the chirp of an insect more than anything else. As we were beating back to camp, a

nest of the Red-rumped Tit-Warbler, *Acanthiza pyrrhopygia* (*A. pusilla hamiltoni*) was found; it was built in a bunch of flowering turpentine, and contained one fresh egg. In the afternoon we went west of the camp, and walked to the border fence. Here we entered a bit of flat country known as Camp Plain. Water is often found here in winter, and we hoped to find timber large enough to attract such forms as *Strepera* and *Astur*. A Striped Brown Hawk (*Hieracidea occidentalis*) was seen leaving her nest, but nothing else of consequence was noticed. Striated Grass-Wrens were too shy to allow of our approaching them. The sky was clouded, and we hurried back to camp, but the rain fell, and we arrived drenched. Rain was badly needed, as the season was late, and we hoped for a good fall early in our stay here, so that the birds would begin laying before we left. Before turning in for the night we watched an eclipse of the moon, and listened to the Spotted Nightjars calling from the big limestone cliffs at the rear of the camp.

On the morning of 16th September it was fine, but the scrub was wet. Scrub-Robins were calling incessantly on the tea-tree flat, and after breakfast we set out in the hope of finding some nests. We had not been in the tea-tree long before some birds were seen, and presently Mr. Scarce flushed a female from a nest containing a beautifully marked egg, heavily incubated. The tea-tree on this flat was dense and of stunted growth, as also were the few mallee bushes that grew there. It was at the foot of these bushes that the Scrub-Robins placed their nests; often one was built on the ground under the tea-tree. Here, also, the Red-throated Whistler, Chestnut-backed Ground-Bird, Rufous-rumped Ground-Wren, and both the Black-backed and Purple-backed Wren-Warblers were numerous. Honey-eaters were also well represented—seven species were identified. A nest of the Short-tailed Ground-Wren was photographed, and at the foot of a tea-tree we found a nest of the Purple-backed Wren in course of building; but when it was inspected on 28th September it was deserted. On the edges of this flat porcupine grass was interspersed with mallee, and here Emu-Wrens and Striated Grass-Wrens lived. While we were trying to secure one of the latter birds a small brown snake, known to us as the "spinifex snake," was seen, and, after much trouble and some excitement, was captured. After shooting birds for specimens, we struck out for camp, and lunch. It has been mentioned that the camp was situated close to the bore; an iron chute had been carried from the pump to a fairly large runaway hole, which was kept filled with water. Though the men were at work within 20 yards, this pool was always well patronized by birds, which came to bathe and drink. One of the visitors was a Raven (*Corvus australis*), and on one occasion it brought a hard crust of bread and soaked it in the water, and, later on, treated a piece of meat in the same way. The bird was twice photographed. After dinner, we again went into the porcupine country in quest of the Emu-Wren, but





The Australian Raven at a Mallee Water-hole.



The Scrub-Robin Perching.

the weather had now become too windy to enable us to see or hear them. Two nests of the Scrub-Robin were found, each containing a chick, one just hatched and the other nearly fledged. A Black-winged Bell-Magpie was secured as it flew low down over the mallee, and towards evening a nest of the Rufous-rumped Ground-Wren, containing three well-fledged young, was found. Just before reaching camp, the large stick nest of a White-browed Babbler, *Pomatorhinus superciliosus* (*Morganornis superciliosus superciliosus*), was examined; it contained three fresh eggs.

There was a sharp frost in the night, and everything was aglitter on the morning of 17th September, but it was clearly seen that, although the morn was so beautiful, the weather would be warm later on. We started out west from the camp, and, keeping away from the spinifex, spent the morning in the mallee, where limestone littered the surface of the ground. Skirting a tea-tree flat, where Scrub-Robins were calling, we searched diligently for nests, but found only old ones. A Rufous-rumped Ground-Wren was flushed from her nest at the foot of a mallee tree. The nest was beautifully hidden in the bark that had peeled from the trunk; it contained two eggs, which were subsequently deserted. Keeping along the limestone ridges, we flushed a Spotted Nightjar, but, aided by a fairly strong wind, it was away through the scrub like a flash. Twice again we flushed the bird, but failed to secure it. A Scrub-Robin was flushed from beneath a mallee bush, and we began a search for the nest. Our usual procedure was to examine the spot carefully from which the bird arose, and, gradually circling out for perhaps 100 yards or more, try to get the female up, as the male followed her uttering his monotonous chirp-like note. We examined the *débris* under every bush, and at length found a nest, partially built. A strange part of this day's performance was, that every time one of us came back to the spot where the guns were left, a bird was flushed there. Leaving this spot, we had gone not more than 150 yards when another nest, nearly finished, was discovered. This we visited at about 6.30 a.m. on 23rd September, when the female bird was flushed and a fresh egg secured. As we came to the edge of a sand-ridge; some Striated Grass-Wrens were seen running rapidly ahead; a few shots were fired, but we did not get specimens. During the afternoon we came to an area of fine country. Every sand-ridge was clothed in tea-tree, and tea-tree and mallee alike were covered with a parasitical Mallee vine. The call-notes of the Southern and the Red-throated Whistlers were heard, and we at once made toward the first-named bird. The eggs of this species are comparatively rare, and to secure specimens was one of the objects of our trip. The male bird has a note very like that of the White-throated Whistler, but not so loud. We discovered a nest, composed of tea-tree stems covered with lichens and mosses, and placed in a tea-tree about 6 feet from the ground. Both the male and female birds were secured. On the way to camp a nest of the Scrub-Robin was found; it contained a chick about a day old.

Rain fell steadily all night, and was still falling while we breakfasted on 18th September. We had intended to shift camp in a few days' time, but the bullocks went off in the night, and the owner had to go after them. They had travelled nearly to Carina, and we had to camp where we were for some days. The bush was saturated. One of us rambled in the scrub close to camp, and was fortunate enough to find a nest of the Red-rumped Tit-Warbler, containing three eggs, and a nest of the Yellow-rumped Pardalote, drilled into a small sand-ridge. About 10.30 a.m. the weather cleared. Mr. Tregellas decided to stay and skin birds. Two of us set off south-east of the camp, and from a nest of the Red-rumped Tit-Warbler, found on 15th September, took a perfect clutch of three fresh eggs. After watching a pair of Chestnut-backed Ground-Birds, we discovered a mound of the Mallee-Fowl, *Leipoa ocellata* (*L. o. rosinae*), already opened up. On the outer rim of the mound was a fresh egg, broken, and bearing four distinct claw-marks, as though it had been gripped by a Raven. Mr. Scarce went back for Mr. Tregellas and the camera, and two photographs were taken. The camera and tripod were left, and we journeyed on. Soon rain began to fall, and the showers continued all day, about 250 points being registered at the camp. The scrub became saturated, and the birds silent. Two mounds of the Mallee-Fowl, on which the birds were working, were found, and we saw and heard many Scrub-Robins, Ground-Wrens, Pardalotes, and Whistlers. We were wet through long before camp was reached.

All night rain fell, and on 19th September it continued, with gales at intervals. All the crab-holes around the camp were full, and a frog was croaking. A pair of Spur-winged Plovers (*Lobivanellus lobatus*) alighted at the bore. We did necessary work in camp, and after dinner, when the weather had cleared, went for a long walk to the south. Our first find was a mound of the Mallee-Fowl in full working order, and, close by, a pair of Spotted Nightjars was flushed from the foot of a mallee bush on a limestone ridge. As we descended this ridge a bird rose quickly from beneath a small mallee, among porcupine grass, and a nest of the Scrub-Robin, containing a fresh egg, was found. This nest was evidently one built last year. Similar instances of this were noticed several times on the trip. Crossing a flat, we entered some thick tea-tree country, and almost immediately found nests, containing eggs, of both the White-throated and Red-throated Whistlers. The nest of a pair of Yellow-rumped Pardalotes was discovered by flushing a bird from its burrow, drilled into the sand, and two eggs were taken from it. When crossing a sand-ridge covered with porcupine grass and small mallee, we flushed a Brush Bronze-winged Pigeon, *Phaps elegans* (*Cosmopelia elegans neglecta*), which feigned injury. Two chicks, about two weeks old, were found squatted on the ground between clumps of porcupine. Another pair of Spotted Nightjars was flushed, and then, in quick succession, nests of the Yellow-rumped Pardalote, containing



Nest of Scrub-Robin (*Drymodes brunneopygius*).



Nest of Yellow-plumed Honey-eater (*Ptilotis ornata*).

eggs and young, and Grey Shrike-Thrush, *Colluricincla harmonica* (*C. h. victoriae*), containing eggs, were found. In the tea-tree another unfinished nest of the White-throated Whistler was noticed. Scrub-Robins were numerous all through this country. A nest of the White-browed Babbler contained three fresh eggs. We walked to a sand-ridge on which a few tall mallee trees grew. From the nest of a pair of Crows four fresh eggs were taken. The birds were not secured, which is unfortunate, as the eggs are probably those of Bennett's Crow, *Corvus bennetti* (*C. b. bennetti*). En route for camp an Owlet Nightjar, *Egotheles novae-hollandiae* (*Egotheles cristata cristata*), was flushed from its nesting hollow in a dead mallee tree. As camp was reached rain again set in.

The morning of 20th September brought fine weather. Birds were singing all around the camp, the Spotted Nightjar mingling its last gurgling notes with those of the Collared Butcher-Bird, *Cracticus destructor* (*Bulestes torquatus colei*). We rose early and started on a long day's walk, taking guns, camera, and collecting kit. We had not proceeded far, through some small whipstick mallee, when a Scrub-Robin's nest, containing a chick about a day old, was discovered. While the photographer was busy another nest was found. It, too, contained a chick. The nests were about 100 yards apart. On a sand-ridge a nest of the Yellow-rumped Pardalote was found by watching the birds. The burrow was dug out, and yielded three fresh eggs. In the flowering tea-tree on this ridge Honey-eaters were plentiful. Two more Pardalotes' burrows were examined. We found many nests of these beautiful birds, but succeeded in obtaining only a few full clutches of the eggs. Working slowly along the flat between the sand-ridges, a Scrub-Robin attracted attention by its excited manner. The nest was soon found, on the ground, in the centre of a big clump of mallee. Here we noticed the White-eared Honey-eater, *Ptilotis leucotis* (*Neoptilotis leucotis mallee*). The birds were very plentiful, but apparently were not yet nesting. Shortly after, we halted for lunch. Before leaving this spot we found nests of the Yellow-rumped Pardalote and Red-throated Whistler, containing three eggs and two eggs respectively. The camera and lunch-bag were dumped, and we went farther into the mallee. A fine mound of the Mallee-Fowl was inspected. As we skirted the edges of a small tea-tree flat a male Scrub-Robin was heard calling. After half an hour's search the female was located, and the rest was comparatively easy. First, last year's nest was found, and within a few yards of it two other old nests were seen. The new nest, containing a fresh egg, was placed on the east side of a small tea-tree. It is strange that this species nearly always places the nest on the east side of a tree or bush. This is the case also with *Cinclosoma*, *Hylacola*, and other birds. Perhaps the object is to get the first beams of the sun, as in the Mallee at this season the weather is exceptionally cold in the morning. Another nest of the Scrub-Robin was found later on, and then a Ground-Wren was flushed from a nest built into the *débris* at the

foot of a mallee bush; the nest contained a full clutch (three) of eggs, so heavily incubated that they were not touched. Two nests of the Scrub-Robin contained chicks, and a Red-throated Whistler, calling from a sand-ridge, directed us, with the result that its mate was flushed from a nest that was ready for eggs. Before reaching camp, a nest, nearly completed, of the Hooded Robin (*Melanodryas bicolor*) was discovered. This species is very rare in this scrub, but 30 miles to the south it is fairly plentiful.

During the night the Southern Stone-Curlew, (*Edicnemus grallarius* (*Burhinus magnirostris magnirostris*), was heard, and the Spotted Nightjar again called incessantly. Rising at 6 a.m. on 21st September, we entered the scrub and collected eggs of Ground-Wrens and Scrub-Robins from the nests found on the 17th, for we anticipated having to shift camp. As the bullocks had not returned when we came back, Mr. Scarce informed us that we would not leave until 24th September, when we would go some seven miles further north, along the border. After breakfast we set out south to investigate a big strip of porcupine-grass country, where Mr. Scarce had located Grass-Wrens. A few mounds of the Mallee-Fowl were opened up, but the birds had not yet started to lay. A nest of the White-browed Babbler held three eggs, and twice we found eggs of the Grey Shrike-Thrush. This form is undoubtedly a connecting link between *C. h. harmonica*, of Eastern Victoria, and *C. rufiventris whitei*, of South Australia (Eyre Peninsula). The call note is decidedly different, the eggs are smaller, and the bird more rufous than the form that frequents the scrubs near Melbourne. More nests of the Golden-rumped Pardalote were seen, and in the porcupine grass we saw many Mallee Emu-Wrens and Purple-backed Wren-Warblers. Ground-Wrens and Grass-Wrens were also fairly plentiful, and Bell-Magpies were heard. The last-mentioned bird was nowhere abundant, but farther north a few were seen. Occasional showers made the bush sparkle. Camp was reached fairly early, after about 15 miles of travelling.

Next morning (22nd September) it was again cold, but we were abroad early after Purple-gaped Honey-eaters. Two birds were shot near the camp, and we saw six species of Honey-eaters in the mallee and porcupine. There were thousands of them here, especially *Ptilotis*, every flowering tree holding dozens of birds, singing and feeding. After breakfast we started out north-west, and in the porcupine grass heard the call note of the Mallee Emu-Wren—the faintest bird-note of these scrubs. Presently a bird was flushed from a huge clump; it darted into the next clump, and in a moment was 30 yards away. But we gradually came near, and a male bird was seen flying into a smaller clump of porcupine. It was hard to dislodge. A female flew into a mallee bush, and the male, as he rejoined her, was secured. A few Striated Grass-Wrens were heard, and occasionally flushed. We discovered two nests of the Purple-gaped Honey-eater, each containing one egg. Both nests were built in the tea-tree

(*Melaleuca*). A pair of Scrub-Robins was watched for some time, the female always returning to the same spot. Eventually a young bird was found, crouched against a small dead stick. The colour of the chick harmonized well with its surroundings, and it remained so still that we probably had passed many of them. We examined the chick, the parents running round excitedly in short circles and with drooping wings and tail. It was amusing to see them, when the young one was released and started to run, with a parent on either side, till at a safe distance from us. Late in the afternoon flatter country was reached. The mallee was a little taller, and here we noticed many Black-eared Miners, but they were not yet nesting. A Black-backed Magpie (*Gymnorhina tibicen*) had taken possession of the largest tree. There were some Black-backed Wrens in the turpentine, and a pair of Brown-headed Honey-eaters, *Melithreptus brevirostris* (*Melithreptus atricapillus mallee*), were feeding in a blossoming mallee bush. This is a rare bird north of Carina, and only a few were noticed. At dusk we retraced our steps, finding, *en route*, a nest of the Yellow-rumped Pardalote, containing young. Some Mallee Emu-Wrens were flushed, but, fortunately for the birds, we could not get near them.

The night was frosty, and it was sharp on the morning of 23rd September. The camp was early astir, and preparations for moving were made. All tents were struck, kit assembled, and the load was on the waggon by 10 a.m. We started for the unknown north. Walking parallel with the waggon as it crashed through the scrub, we jogged on through the day, over sand-ridges and across spinifex country, now and then sighting the waggon. In a clump of porcupine grass a Red-throated Whistler's nest was found, containing two eggs. After we had been walking for about 4 miles the mallee assumed larger dimensions, and here we met with the Purple-crowned Lorikeet, *Glossopsitta porphyrocephala* (*Glossopsitta p. porphyrocephala*), but it was rare, only some six specimens being noticed during our trip. About 60 miles south-east, however, they are to be seen in thousands. Twice we flushed an Owlet Nightjar from a hollow, and nests (containing fresh eggs) of the Yellow-rumped Pardalote, Black-backed Magpie, and White-browed Babbler were found. In a nest beneath a small tea-tree a Scrub-Robin, just hatched, was seen. Three of the men killed a large snake (non-venomous), measuring about 8 feet in length. As we approached the site of our new camp the country suddenly altered—the sand-ridges were much taller, closer together, and not always running east and west, but often north and south, and forming gullies overgrown with tall tea-tree. Twice we located Scrub-Robins in these, and in each case the nest contained a chick. A mound of the Mallee-Fowl was opened, and found to be ready for the eggs. We reached the new camp at about 4.30 p.m. It was on a small round plain, bounded by sand-ridges on the west, and covered with turpentine and grass. A solitary tree grew in the centre of the plain. Before

darkness came everything was in order. Just before dusk a Striated Grass-Wren was heard calling from the porcupine at the rear of the camp.

It was a fine, clear morning on 24th September, after a heavy frost. Crested Bell-Birds and Honey-eaters were calling all around us, and a Bronze-winged Pigeon was feeding close to the tent. Mr. Kenyon, of the State Rivers and Water Supply Department, had arrived during the night, and, hearing the bullock bells in the distance and finding ornithologists in camp, he named the locality Bell-Bird Bore. Before breakfast we took a stroll to the top of the big sand-hill to look at the country to the north. As far as the eye could reach—and in this beautiful clear air one can see over many miles—were sand-hills, and in the immediate vicinity porcupine grass. Bird-life was abundant in the gullies, but the Purple-backed Wren-Warblers and Yellow-rumped Pardalotes kept to the ridges. Two nests of the latter, each containing full clutches of eggs, were dug out. On the plain we saw a Black-eared Cuckoo, *Mesocalius osculans* (*Owenavis osculans osculans*). After breakfast we again ascended this ridge, dipped into a basin, doubled back across the flat and up another narrow gully, securing several specimens. Returning to camp, we visited the large tree on the plain; it was about 35 feet in height, the tallest mallee seen on the trip. A Nankeen Kestrel, *Cerchneis cenchroides* (*C. c. cenchroides*), had taken possession of a hollow, which contained one egg. After dinner we again went north, and spent the afternoon in the porcupine grass in a vain attempt to secure Striated Grass-Wrens. A nest of the Purple-backed Wren-Warbler was found in the dead and open centre of a huge clump of porcupine grass; the male, resplendent in purple and blue, the female, as well as immature birds, were seen at the nest. A nest of the Yellow-plumed Honey-eater, *Phylotis ornata* (*Lichenostomus o. tailemi*), was found, suspended in the topmost branches of a small mallee; it contained two fresh salmon-tinted eggs. Close by, a nest of the Short-billed Tree-Tit contained young. Here, again, we met with the Mallee Emu-Wren, but the birds kept close to the porcupine grass. On all these sand-ridges a parasitic creeper (mallee vine) was growing in profusion, and in this the *Pachycephala* were fairly plentiful. A male bird was secured, and the female was lured off the nest by whistling, but could not afterwards be found. In our many circlings made to find the nest we became uncertain of direction. After making a few futile attempts to find the biggest range (they all looked large just then), we were proceeding in the wrong direction, when the bullock bells were heard directly in our rear, and a long way off. At night we anathematized the bells, but just then they made sweet music. On the return to camp we kept to the top of the sand-ridges. We flushed a small bird from a nest (containing three fresh eggs) at the foot of a melaleuca. After a long wait, a female Wren-Warbler cautiously returned to the tree, and presently was followed by a male Purple-backed Wren-Warbler



Nest of Striated Grass-Wren (*Amytornis striata*) in Porcupine.



Nest of Yellow-rumped Pardalote (*Pardalotus xanthopygius*).

FROM PHOTOS. BY T. H. TREGELLAS.

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ASTOR LENOX TILDEN FOUNDATION

The eggs of the species are comparatively rare. Black-backed Wren-Warblers are always found in pairs during the breeding season, but in the case of the Purple-backed species one usually sees the male and female accompanied by two or three sober-coloured birds, including an immature male. Probably they are young of the previous year and the birds do not reach maturity until they are two years old.

Rain set in early on 25th September, and continued till about 1 p.m. We travelled north to find a pine ridge. We flushed a Redthroat, *Pyrrholæmus brunneus* (*Pyrrholæmus b. brunneus*), from a beautiful nest, placed in the open centre of a porcupine. There were three chicks, not long hatched. Two Blue-winged Grass-Parrots, *Euphema chrysostoma* (*Neonanodes chrysostomus*), were feeding on the grass, and the male was secured. In a gully farther on we found three nests of the Bell-Magpie; from one of these two eggs were obtained. On a flat overgrown by salt-bush Black-backed Wren-Warblers were fairly abundant. We found nests and eggs of the Grey Shrike-Thrush and the Crested Bell-Bird. Mr. Scarce went farther west to a sand-ridge to look for the pines. Specimens of Ground-Wrens (*Hylacola*), Ground-Birds, and Grey Goshawk, *Astur cinereus* (*Leucospiza clara clara*), were obtained. After lunch a nest of the White-eared Honey-eater was found, at the foot of a tea-tree (*Melaleuca*) growing on a sand-ridge. The sitting bird allowed us to approach to within a few feet before leaving. The nest contained two eggs. Rain fell, the strong westerly wind driving it in our faces and drenching us to the skin. Every gully appeared to contain a pair of Bell-Magpies, but no more nests were found. We reached the border fence, and, on a plain, met with the Many-coloured Parrot, *Psephotus multicolor* (*Psephotus varius varius*). We were far from camp, and the day had nearly gone when we retraced our steps.

We were astir at dawn on 26th September, when everything was white with frost. Most of our goods were sent off by the bullock waggon, as we had only two more days to spend in camp. We must go due north to try to locate the pine ridge that was missed yesterday. Mr. Scarce had been there some three months before. He travelled on horseback, and, coming back on his tracks, left a trail easy to follow. On 25th September we left the track, and went much too far west. As we ascended a sand-ridge, a burrow of the Yellow-rumped Pardalote was discovered, and in a clump of porcupine grass at the foot of a mallee bush a nest of the White-eared Honey-eater. A little further on we came to a patch of whipstick mallee, and in this found Scrub-Robins, Ground-Wrens, and Ground-Birds. We hunted for nests without success. Reaching the top of a sand-hill, we at last saw the pine ridge, apparently three miles away, and it was reached after a 40-minutes' walk. These were the first pines that we had seen north of Carina, nearly 40 miles away. Here grew silver grass, interspersed with tall turpentine. The bird-life was

different. Bell-Magpies, White-winged Choughs, Ravens, and Black-backed Magpies were calling everywhere. A Nankeen Kestrel and a Striped Brown Hawk were flushed from nests high up in the belahs (Casuarinas). A small Grey Falcon was seen. We were particularly anxious to secure this bird, as it is supposed by us to be a new species. Three times we have seen it in the Mallee, and Mr. M'Lennan ("Mallee-Bird") took a clutch of three eggs (now in Dr. Charles Ryan's collection) a few years ago. This bird is about the size of a Cuckoo-Shrike, and of the same colour. The eggs are supposed to be not larger than those of a Kestrel, and blue-white in colour. In the pines we saw the Red-capped Robin, *Petroica goodenovii* (*Whiteornis g. goodenovii*), and Rufous-breasted Whistler, *Pachycephala rufiventris* (*Lewinornis rufiventris inornatus*) for the first time. In the turpentine many Black-backed Wren-Warblers, Red-rumped and Chestnut-rumped Tit-Warblers were observed, also Scrub-Robins and Ground-Birds. We watched a family of Black-capped Tree-runners, *Neositta pileata* (*Neosittella pileata tenuirostris*), as they worked down and under the branches of the pines in search of food. Mr. Scarce estimated that the pines covered about 300 acres, and in the centre we found some huge patches of stone, similar to granite. Most of the larger flat pieces had evidently been hollowed by natives long ago, so that they would hold water. About these stones bird-life was very abundant. Leaving the pines, on the return to camp, we spent an hour or more in the whipstick scrub. When the scrub was left behind the sun was low in the west, and we had 6 miles to walk in darkness. Twice we flushed a Spotted Nightjar from small limestone ridges, but the birds were apparently not nesting. Camp was reached just as our mates were arranging to light a fire on the big sand-hill to guide us home. We must have travelled at least 17 miles, and were thoroughly tired out.

A beautiful morning, with a heavy white frost, on 27th September. The ice was an inch thick on water in the bucket. We were tired, and after breakfast just strolled about the scrub close to camp and along the limestone ridges in search of Spotted Nightjars. During the morning we flushed birds in five places—once a pair lying close together—in all, six birds. (Mr. Scarce subsequently brought one of us—Mr. Howe—an egg, nearly incubated, taken on 12th October. It was lying on a limestone ridge, close to a large, dead stick. Mr. Kennedy, who found it, had literally to push the bird with the barrel of his gun before she would fly.) A nest of the Black-faced Cuckoo-Shrike, *Graucalus melanops* (*Coracina novæ-hollandiæ melanops*), containing three fresh eggs, was found, built on the horizontal bough of a small mallee tree. A nest of the White-shouldered Caterpillar-eater (*Campephaga humeralis*) contained young birds. In the afternoon Mr. Scarce took us out to a few mounds of the Mallee-Fowl that we had seen before, and six eggs were taken from them. This was our last day in camp, and, after tea, everything was packed up.

We left camp on the morning of 28th September. After an early breakfast, all the "boys" were assembled to see us off. A photograph of the party in front of our tent was taken, and then we said good-bye. Our luggage was to go by bullock waggon to Lingerandye Bore, where we were to meet Mr. Ribbons, who would drive us to his farm at Carina. As the bullocks went across the plain and on to the road south, we struck into the scrub, intending to walk through and collect on the way. We visited a large mound of the Mallee-Fowl. Before the mound was opened, Mr. Scarce asked us to take particular notice that each egg would not be standing up perfectly straight, but would have a leaning toward the top-centre of the egg-chamber. He added that they were always placed thus by the birds. He was correct. He told us many interesting facts concerning the birds. On one occasion he saw a young bird scrape its way to the surface. As soon as it reached the air it gasped. Mr. Scarce immediately covered it again with sand taken from the top of the mound, and in a few minutes the bird was suffocated. Another mound opened contained four eggs. Mr. Scarce put the compass on it, and, drawing a plan on a piece of paper, he marked the eggs and shifted them into different positions. Some were placed wrong end up and leaning toward the wall of the egg-chamber. The mound was then filled in and the observer retired. Three hours later he again opened it, and, putting his plan in the proper direction, he found that, not only had the bird placed the eggs right end up, but had put them back into the identical positions in which they were found originally.

After crossing a sand-ridge covered with tall porcupine grass, we again met with Grass-Wrens and Emu-Wrens, and, in the gully, a Bell-Magpie was flushed from a nest placed in the top-most branches of a fair-sized mallee tree; it contained two eggs. We found two nests of the Black-eared Miner, ready for eggs. As we neared our old camp we visited Tea-tree Flat, where we had left nests of the Purple-gaped Honey-eater. One nest contained an egg on 22nd September. As we approached the bird was flushed, but there was still only one egg in the nest. Another nest, nearer our camp, was examined; the bird allowed us to approach to within a few feet before leaving. This nest contained two fresh eggs. We had lunch at the bore, where Mr. Ribbons's son awaited us, and while we were eating a fox stole out of the scrub and up to the water, not more than 20 yards away. It quietly trotted up and drank, and, after surveying us for a moment, as quietly stole away. Its pace, however, was quickened by the discharge of a small dust-shot cartridge. Just before leaving Lingerandye we witnessed a fight between two stump-tailed lizards (*Trachydosaurus rugosus*). We arrived at the homestead hungry after a long drive, and enjoyed a good meal and a most refreshing sleep.

On 29th September we spent a few hours searching the bush around the homestead, and found a nest of the Bell-Magpie; it

contained a fresh egg that had been broken by Ravens. Close to the house a pair of Black-faced Cuckoo-Shrikes had built a nest in a pine tree. In another pine a pair of Frogmouths was hidden, and some Redthroats frequented the blooming marguerites. Black-backed Wren-Warblers and a Rufous Song-Lark, *Cinclo-rhamphus rufescens* (*Ptenædus mathewsi vigorsi*), were also seen, and just before leaving a Chestnut-rumped Tit-Warbler, *Acanthiza uropygialis* (*A. u. ruthergheni*), which flew into the stable, was found to have a nest, containing three fresh eggs, between the folds of a sack.

A delightful drive into Murrayville took us into civilization again and away from the interesting birds of this remarkable Mallee District of North-Western Victoria.

Bird Life in the National Park, N.S.W.

BY (DR.) E. BROOKE NICHOLLS, MELBOURNE.

DURING the Sydney session of the British Association for the Advancement of Science a visit was paid to the National Park at Port Hacking. The party included Mr. and Mrs. A. H. Evans (Cambridge), Mr. A. É. Le Souëf (Director of the Zoological Gardens, Sydney), and Mr. and Mrs. H. Burrell, who put their motor-car at the disposal of the visitors.

After an hour's run from Sydney the edge of the table-land overlooking the Park was reached, and a magnificent view was obtained. Range upon range of purple hills of the wonderful Hawkesbury sandstone ran back to the horizon, while nearly 2,000 feet below lay the shining waters of the Hacking River. Descending the long, winding road to the Park, the mellow notes of a family of Pied Bell-Magpies (*Strepera graculina*) were heard. These birds were numerous, and so confiding that they came on to the verandah of the Rest House and ate cake provided by the fair picnickers. Mr. Burrell called them "afternoon tea birds."

Reaching the Park, the party secured a boat, and rowed up stream. The banks of the river, clothed in a sub-tropical scrub (the so-called "brush") of palms and araucarias, climbing vines (*Ficus*), Moreton Bay figs, birds'-nest ferns, and tree orchids, together with the familiar eucalypts and *Casuarina*, presented a beautiful sight. The very striking Flame or Fire trees (*Sterculia aceriptia*), with their masses of vivid scarlet flowers, make a wonderful contrast to the dark background of evergreens. These trees are invaded by Honey-eaters, principally the Yellow-eared (*Ptilotis chrysotis*) and the Spinebill (*Acanthorhynchus tenuirostris*). While we were rowing, a "green" Satin Bower-Bird (*Ptilonorhynchus holosericeus*) flew overhead. A few Black Ducks (*Anas superciliosa*), Grebes (*Podiceps novæ-hollandiæ*), and Moor-Hens (*Gallinula tenebrosa*), quite unalarmed, made for the undergrowth of the banks, while Black Swans (*Chenopsis atrata*) swam alongside the boat, waiting to be fed. Arriving at the camping-

ground—a tangled mass of moss-grown rocks and ferns and brush and bracken—the billy was boiled, and lunch eaten under the shade of a Cabbage-tree Palm (*Livistona australis*). Bronze-Cuckoos (*Chalcococcyx basalus*) and Fan-tailed Cuckoos (*Cacomantis flabelliformis*) called, and the notes of the Harmonious Thrush (*Colluricincla harmonica*) rang clear and sweet along the river valley. Many other species were seen and heard. Mr. Le Souëf discovered a nest of the Rock-Warbler (*Origma rubricata*). It hung from the under surface of a large rock wall which had fallen slantwise across several other boulders, forming a miniature cave. It was easily perceptible in the dim light of the rock shelter, but was not so readily seen some distance from the entrance. The nest, a long, domed structure, twice the size of a soldier's water-bottle, was composed of bark and covered with cobweb—a dark slaty colour. It was suspended by fibrous material, wedged and twisted round a plate of rock projecting from the surface. It contained three pure white eggs. Both nest and eggs appear large for the size of the bird, of which, unfortunately, we did not catch a glimpse on this occasion. Upon the return trip down the river a close search was made for the Lyre-Bird (*Menura superba*), without success. Five days later three pairs were met with. Several pairs of the Blue Kingfisher (*Alcyone azurea*) were met with, the boat passing within 15 feet of one bird. Their tameness drew forth the remark that in England only a flash of blue would have been seen as a Kingfisher darted round a bend in the stream. The nest of a Lyre-Bird, constructed in the previous season, was inspected. It was built on a rock face overhanging the river, 15 feet above the water, where some 500 to 1,000 people pass every Sunday during the summer months. A motor road passes within 6 feet of the nest. A young bird was reared in this nest last year. The parent birds fed with fowls belonging to one of the Park rangers, whose house is situated less than a quarter of a mile from the nest.

On the homeward journey a halt was made at Tom Ugly Point, on the George River. At the Sea Breeze Hotel the famous "Cocky Bennett," a White Cockatoo (*Cacatua galerita*), reputed to be 117 years old, was examined. The history of this bird, as far as I could ascertain, is as follows:—Mrs. S. Bennett, the proprietress of the hotel, has owned the bird for 26 years. It was given to her by Captain George Ellis, late of Tanner's Island and Fiji. Captain Ellis, at the age of 9 years, was bound apprentice to a South Sea Island sailing vessel. The bird was then in the possession of the captain of the ship. Ellis became boatswain, and eventually captain, of the ship in which he first sailed. Captain Ellis used to stay with Mrs. Bennett, then Mrs. Bowden, of Bowden's Hotel, Elizabeth-street, Sydney, when his ship was in port. He died 26 years ago, and left the bird to Mrs. Bowden on the condition that she would never part with it. Mrs. Bennett informed me that she had promised the bird to the Sydney Museum, should it survive her. "Cocky Bennett" is

practically featherless. But it has more feathers now than it had seven years ago. Two feathers which hang from the back of the head are sulphur-yellow. The upper portion of the bill is abnormally long. Mrs. Bennett, in my presence, unlocked a small leather receptacle and took out seven pieces of what had once formed portion of the bird's beak; total length, 17 inches. There were originally eight pieces, but one has been lost. After Captain Ellis's death, some 5 years elapsed before the ship came to Sydney, bringing the Cockatoo with it. Mrs. Bennett has had the bird in her possession for 21 years.

We were unfortunate in not seeing or hearing Lyre-Birds when in the Park with the overseas visitors; but, on the following week-end, Mr. and Mrs. Burrell and myself spent two days there, and had much better luck. As before, we rowed up the river, passing our camp of the previous Sunday. We had not travelled more than a hundred yards, round a bend, when the nest of a pair of Black Swans came into view. It contained five eggs, and the male bird was on the nest. (In another nest, some miles down the river, known to Mr. Burrell, the male bird invariably sits on the eggs during the day time.) The female bird joined her mate in the defence of the nest as preparations were made to secure a photograph. This nest was built of coarse sticks and twigs and river-weed, and anchored to a snag in the water 18 inches deep. The other nest seen by Mr. Burrell was built entirely of river reeds. It also contained five eggs (the full clutch). Continuing up stream, the river presents more and more of a tropical appearance on account of the near approach of the banks. We were on the look-out for Lyre-Birds, and unexpectedly came upon them, our attention being attracted by the call notes, loud and shrill, and the calls of many other birds, rapidly repeated. Landing, we saw a Lyre-Bird run across a rock not more than 15 yards away. It was joined by another bird. Both proved to be males, engaged in a rivalry of song. They faced each other, 3 feet apart, with wings outstretched and tails raised, the tail quills quivering and rattling. For several minutes the bush resounded with calls of many kinds as the two birds vied with each other. Then the notes suddenly ceased, and, with lowered tail, one of the birds walked away 6 or 7 yards, but immediately ran back upon a challenge being uttered by its rival. This occurred several times. The repertoire of one of the birds (the challenger) was not equal to that of the other, while its tail feathers appeared to be fewer and shorter. It was probably a younger bird. We listened to these birds for 25 minutes, and the following is a list, made on the spot, of the bird-calls mimicked:—

(1.) Coachwhip-Bird (*Psophodes crepitans*).—Perfect imitation, including the low "indrawn" note and crack, followed by the two final notes of the female.

(2.) Harsh guttural notes uttered by male Coachwhip when female is on nest and danger threatens.

(3.) Harmonious Thrush.—Three different calls of this bird were mimicked.

(4.) Black Cockatoo (*Calyptorhynchus funereus*).

(5.) King Parrot (*Aprosmictus scapulatus*).

(6.) Crimson Parrot (*Platycercus pennanti*).

(7.) Southern Stone-Curlew (*Edicnemus gallarius*).

(8.) *Strepera* (two different calls).

(9.) Great Brown Kingfisher (*Dacelo gigas*).—Various notes were mimicked at intervals, but never the whole "laugh."

(10.) Black Swan (the birds calling to one another as they fly overhead in a flock).

(11.) Scrub-Wren (*Sericornis frontalis*).

(12.) A mechanical note of some kind.



Cocky Bennett

(Reproduced by permission of Mrs. Sarah Bennett).

PHOTO. COPYRIGHT.

Several notes we could not recognize, one of which, however, we thought was that of a Bower-Bird.

On the return down the river, not more than a mile and a half from the Rest House, we heard another bird calling. As we pulled down the middle of the stream we obtained a perfect view of a male bird standing on a huge boulder. It mimicked

Cockatoos, the Wonga Wonga Pigeon (*Leucosarcia picata*), and other birds. As the boat neared the bank the bird moved to the edge of the rock, and hesitated for a second or two before crossing to another rock, some 12 feet below. It took the air with outstretched wings, and we were astonished at the noise it made in alighting. We heard its claws strike the rock, although it was 40 yards distant. The bird, which had been joined by its mate, climbed along a sloping tree-trunk, and progressed from rock to rock till it reached the steep, irregular face of the sandstone cliff, which it rapidly scaled to a height of 150 feet or more, using both wings and feet. The *Archæopteryx* must have progressed in a similar manner.

The Emu of King Island.*

BY L. BRASIL.

(Extract from the *Bulletin de la Société Linnéenne de Normandie*, 6e serie, 6e volume, 1913.)

EMUS were in great numbers in King Island at the time when Baudin's expedition landed there, at the beginning of the last century; but this state of things did not last long. The frequent visits paid to the island by seal-hunters, and, above all, the importation of dogs trained for the capture of kangaroos and Emus, soon brought about the complete disappearance of the latter.

For a long time the little we knew about the Emus of King Island was only what Péron says about them in the "*Voyage de Découvertes aux Terres Australes*," and the supplementary particulars which Milne-Edwards and Oustalet † gave later on by publishing a manuscript document, which is preserved at the library of the Natural History Museum at Le Havre, and which is included in Péron's papers. Unfortunately, the latter died before having been able to complete the study of the very large quantity of materials gathered by the expedition, and which he had bequeathed to his friend and companion, Lesueur. Till then, therefore, our knowledge was limited to Péron's account. Nothing, and particularly no skin, no remains of the bird, made it possible for us to make our knowledge more complete or exact. And it was so until 1903, at which date Campbell ‡ announced the discovery made at King Island, in ground of recent formation, of remains of an Emu, consisting of a posterior limb and a fragment of pelvis:—

"The remains, in a fair state of preservation, were found on the margin of a lagoon on the east coast. In other parts of King Island, and also on

* Translated by M. Maurice Carton (Melb. Univ.) and Miss C. M. Van Nooten (Essendon High School). At the editors' request, as literal a translation as possible was made.

† A. Milne-Edwards and E. Oustalet, "*Note sur l'Emeu noir (Dromæus ater, V.) de l'île Decrès (Australie)*." *Bull. Mus. Hist. Nat.*, v., pp. 206-214, 1899.

‡ A. G. Campbell, *Emu*, iii., p. 113, 1903.

other large islands in Bass Strait, notably Kent Group, sand drifts sometimes expose remains of the Tasmanian wombat, now extinct on all islands but Tasmania itself, but this is the only occasion on which the Emu has been associated with them in the same sands forming the land surface of to-day. It is significant that the specimens show no difference from the corresponding bones of the mainland Emu, from which, then, the Tasmanian variety, extinct only since the white man's advent, could not have essentially differed" (p. 113).

As a consequence, the Emu whose bones had just been unearthed was at first referred to the continental species, *Dromaius novæ-hollandiæ*. Its much smaller dimensions are, however, sufficient to show how different it is, and Spencer distinguishes it under the name of *D. minor*, of which *D. bassii*, Legge,* is the exact synonym. On the other hand, when comparison in relation to their length is made with the corresponding bones in *Dromaius peroni*, the bones of the lower limb of *D. minor* show very near proportions, and it is not possible to make any deductions from these measurements, taken on a single specimen, as far as *D. minor* is concerned, although this is done on the relative size of this bird, as is shown in the following table:—

		Femur.	Tibia.	Tarso- Metatarsus.
<i>D. peroni</i> , Museum, Paris	...	185 mill.	345 mill.	280 mill.
<i>D. minor</i> ...	...	180 "	330 "	280 "
<i>D. peroni</i> , Museum, Florence	...	168 "	300 "	240 "

Thus it is not necessarily true that *D. minor* should have been smaller than *D. peroni*; and, on the other hand, if the leg of the Paris specimen be proportionally a little longer, that of the Florence specimen is, on the contrary, slightly shorter. Therefore, as is shown by this example, it is not in their dimensions that a differential characteristic feature is likely to be found between the Emus from the two islands, supposing there be any. A very remarkable and ingenious interpretation of the Emu of King Island has been given by Mathews,† and it is precisely this interpretation which is the cause of this article.

All the arguments in favour of his thesis were borrowed by Mathews from the specimens represented in Plate XXXVI. of the "Voyage de Découvertes aux Terres Australes"—the plate executed from drawings by Lesueur, one of the members of the expedition, to which he was attached as a painter of natural history. The explanation of this plate is as follows, and it is well to reproduce it entirely:—

New Holland: Decrès Island.

Cassowary of New Holland (*Casuarus novæ-hollandiæ*, Lath.)—1, male cassowary; 2, female cassowary; 3, young cassowary, about five weeks old. The two birds marked with longitudinal stripes are 20 or 25 days old.

Moreover, it is shown that the specimens are drawn to the scale of one-tenth of the natural size. Let us add that Decrès Island

* *Emu*, p. 119 (1907).

† G. M. Mathews, "The Birds of Australia," i., pp. 23-26, pl. 4, 1910.

is another name for Kangaroo Island, and that at the beginning of the 19th century naturalists still included the Emu in the Cassowary genus.

Now let us examine Mathews's hypothesis. Here is the exact text of his argumentation :—

"On the left of the picture (la planche XXXVI., du *Voyage de Découvertes aux Terres Australes*) is figured a white-breasted Emu, and on the right are two figures of a black-breasted bird, one large, the other small. It would appear that Péron considered these were all of the same species, for, in his account of the Cassowaries of King Island, he refers to this plate, as though the birds from King Island were identical with those from Kangaroo Island. We know, from recent research, that they were not, *D. parvulus* (synonym of *D. peroni*) from Kangaroo Island being distinct from *D. minor* from King Island. . . . Nothing has been said of the white-breasted Emu figured by Lesueur in Péron's Voyage, and it would seem that the French naturalists did not distinguish between the white-breasted and black-breasted birds, but even considered them to be identical with the common Emu of the Australian continent (*D. novæ-hollandiæ*). Anyone examining the figures in Plate XXXVI. of Péron's work can see that the Emu depicted on the left of this plate can hardly be the same as the black-breasted bird figured on the right.

" * * * * *

". . . . As the black-breasted bird in the Paris Museum is certainly from Kangaroo Island, and it is hardly possible that two species were found there, I think the white-breasted bird must have been the representative Dwarf Emu of King Island.

" * * * * *

"In the plate (Plate IV., Mathews's 'Birds of Australia'), which is a reproduction of the illustration in Péron's work, the left-hand figure represents, in my opinion, the Dwarf Emu of King Island" (pp. 24-26).

Therefore, according to Mathews, Plate XXXVI. of the "*Voyage de Découvertes aux Terres Australes*" shows, on the right of the illustration, the Emu of King Island, and, at the moment when his first volume of "*The Birds of Australia*" was being published, he looked upon this specimen as a representation of the bird whose sub-fossil bones had been gathered at King Island a few years before—that is to say, of *D. minor*, Spencer; and, in fact, it is mentioned and drawn under this name in the book. But later on, being less sure of the identity of the two birds, and undoubtedly admitting then that two kinds of Emu might possibly exist in the island, Mathews* calls *D. spenceri* the same specimen on the right of the plate by Lesueur—that is to say, the Emu which he designates as "White-breasted." Finally, while revising the genus *Dromaius*, Dubois† gives an analytical key, which he holds, he says, from Mathews himself, and in which *D. spenceri* is not included, *D. minor*, on the contrary, being mentioned and characterized by the whitish colour of the feathers in front of the neck. Further on, whilst enumerating the

* G. M. Mathews, "A Reference-list to the Birds of Australia," *Novit' Zool.*, xviii., p. 176, 1912 (note, infra-paginale).

† A. Dubois, "Coup d'œil sur les Oiseaux Ratites," *Bull. Soc. Zool. France*, xxxvii., p. 309, 1913.

species and sub-species, *D. spenceri* is classified as *D. minor*. Therefore, it seems as if Mathews has gone back to his first opinion. However, let his "White-breasted Emu" be, according to him, identical with *D. minor*, or let it constitute a distinct form, *D. spenceri*, one point remains invariable in Mathews's mind—that is, that the Emu on the right of Plate XXXVI. of the "Voyage de Découvertes aux Terres Australes" comes from King Island.

I am going now to try to prove that it is not possible to adopt this opinion, and I think that I shall succeed in doing so without even drawing any arguments from the difficulty there is to attribute a different origin to a specimen formally designated by naturalists so careful in detail and so precise as Péron and Lesueur, as having been observed in Kangaroo Island; and this difficulty should be sufficient for throwing out Mathews's suggestion. I shall begin by recalling what we know of the Emus seen in King Island by the French travellers, what Péron says about them in his relation of the journey, the main points of the manuscript document published later on by Milne-Edwards and Oustalet (of which I spoke previously, and which I have with me just now). The naturalists of the corvette *Le Géographe*, in company of Lesueur, landed on King Island on 10th December, 1802, and re-embarked on the 23rd. During the whole of their stay on land the weather was very bad. Twice *Le Géographe* was forced by the storm to sail away from the dangerous coasts of the island, leaving the unfortunate men without any arms, provisions, or shelter. Undoubtedly they would have been starved to death but for the opportune help given to them by some English fishermen settled there, and who were the only inhabitants. The torrential rains which fell unceasingly, the hurricanes which blew without interruption, did not permit the pursuit of any scientific researches, and it is only, it seems, in the meat store of the fishermen that Péron's observations of King Island's Emus were made. What he says of them, in the passages in which he speaks in a general way of the productions of this land, does not apply very well to the kind which was found there, if one may judge from the text of the Havre manuscript, as well as by what the discovery of the bones of *D. minor* has taught us. When Péron speaks of "the powerful Cassowary, from 16 to 22 decimeters high (5 or 6 feet)" he is most likely thinking of the continental kind, to which undoubtedly he assimilates all those belonging to the southern islands. Therefore, this detail is valueless. But more important are the following passages relating either to the description of the English fishermen's dwellings, or to the way the latter secured the big game which provided them with the meat necessary to their alimentation, or, again, to the conditions of existence of Péron and his companions:—

" At the side could be seen a sort of butcher's hook, on which five or six Cassowaries were hanging (p. 18). . . . As for the Cassowaries and kangaroos, the fishermen, in order to catch them have

trained dogs, which search the woods, and rarely fail to throttle several of these animals every day. . . . It is not only because we heard these details from the fisherman that I speak of them ; we were able ourselves, as it will be shown later on, to judge of their correctness, during our stay in Decrès Island (p. 19).

" It was then that we felt more keenly than ever the inconvenience of the wretched obstinacy on the part of our chief to refuse firearms and ammunitions to the men whom he sent to shore (p. 20)."

These passages prove to us that if Péron and his companions, more particularly Lesueur, were able to see bodies of King Island's Emu, they did not see any alive. They did not follow the dogs trained to capture the birds, and the lack of firearms prevented them from hunting, even at the very moment when they were most in need of them to provide their own food.

The document published by Milne-Edwards and Oustalet corroborates this way of thinking. It is a schedule of questions drawn by Péron, and the answers are certainly from one of the English fishermen settled on the island. It refers to the Emu. It is obvious that several of the questions would not have been made if the travellers had had any opportunity for making a personal study of the bird. The following are extracts :—

" 1. *English name ?*

" Hemeo. (Emu.)

" 2.

" 3. *Do they live by themselves or in flocks ?*

" They are generally single, but at the pairing time they go from 10 to 20 together, and when each male has made his choice of a female they separate from the rest and go away in pairs.

" 4. *Does the plumage vary in colour according to age ?*

" The young ones have a greyish plumage, which becomes quite black as they grow up, and when the big feathers come on.

" *Does the colour of the plumage vary according to sex ?*

" Same colour, though the male's may be brighter.

" *Does it vary in colour according to seasons ?*

" It does not change.

" 5.

" 6. *Which is the largest size they attain ?*

" In King Island, almost 4½ feet ; they are smaller than in Sydney.

" *What is the weight of the bird then ?*

" The heaviest weighs from 45 to 50 pounds.

" 7. *Is the female bigger or smaller than the male ?*

" The male is bigger, but the difference is not great.

" 8.

" 9.

" 10. *How do they defend themselves against their enemies ?*

" With their feet, like horses do with their hoofs, and they can do much harm.

" 11.

" 12.

" 13. *What is their usual food ?*

" They feed on the berries of (?), on *Ficoidea*, seaweeds, though rarely, and on different kinds of grass. The food in their stomachs smells very pleasantly. Gravel is to be found in all of them. Swallowed nails.

"14. *Do they run quickly, and for a long time?*

"They run very quickly, but those of King Island, being too fat, run ten times less quickly than those of Port Jackson, generally not more quickly than a very good dog, even those of Sydney.

"*Can they swim, and do they jump?*

"They swim well, but only when it is necessary; afterwards they stop and shake off the water. He did not see them jump.

"15. *Do they make use of their wings in order to accelerate their running?*

"He never saw them making use of their wings either to run or to swim.

"16. *Do they not make use of these wings to defend themselves?*

"Not to defend themselves, but they make use of the nail which is at the end of each wing to scratch themselves with.

"17. *Which are the places they live in in preference? Are they damp and swampy? Sheltered by trees or unprotected? Dry, high or low?*

"They are fond of living near lagoons, and in the shade rather than in the open.

"When pairing time comes they come to the shore, and each male makes his choice of a female.

"18. *Do they live constantly in the same spots, or, at different times, do they go to other parts of the island?*

"There is no migration.

"19. *At what time of the day do they seem looking for food more particularly?*

"Mornings and evenings only; they come to the shore.

"20. *Do they seem to prefer spots where fresh water can be obtained? Is this water indispensable?*

"They cannot do without it.

"21.

"22.

"23. *Do they build nests? Where? With what material? How are these nests made? What is their width and their height?*

"They build them on the ground, under the bushes and near the lagoons, with small, dry sticks; they line them inside with dead leaves and some moss, which is found at the foot of trees. Their shape is oval, and they are not very deep in proportion to the size of the animal and the shape of its body.

"24. *When are the eggs laid, and how many each time?*

"From the 25th to the 26th of July females were all ready to lay. He saw seven eggs in one nest, but he also saw two nests, the one with eight small Emus, and the other with nine.

" * * * * *

"25. *How long does the incubation time last?*

"He thinks five or six weeks, judging from the time lapsing between the moment when he saw the first eggs and he found the first young birds.

"*Does the female only perform the incubation, or is she helped by the male?*

"He is not sure, but he remarked that the breasts of several males were without feathers at the time of incubation; he believes that they also take a share in the hatching.

"*Does the male feed the female during hatching time?*

"They do not leave their nests, and are always in pairs near each nest; one of them on the eggs, the other near the nest.

"26. *What is the size of the young birds when they are hatched? Can they run about at once?*

"As large as a man's fist; their limbs are weak, and they cannot run. Their growth is more rapid from the fourth month after the hatching.

"*Have they a thick down or feathers?*

"They are covered like young Turkey-hens, but all striped with black lines in the length of their bodies.

"*About what time do they leave the nest?*

"Two or three days after birth they leave the nest to go and drink; the big birds cause berries to fall to the ground, and the young ones eat them, after which they go back to the nest. They leave it for good when they are strong enough to provide for themselves.

"27. *What is their position when at rest and asleep? Are they usually standing up? Do they bend their knees to rest on the ground? At night do they lie on the ground or do they stand up to rest?*

"They bend their legs to rest or sleep, and support themselves on the sternum.

" " (*loc. cit.* pp. 209-212).

It is not necessary to show all the importance of the documents whose extracts have just been given. It not only provides valuable information (particulars)—all we have as to the characteristics and the habits of an extinct bird—but it also shows us how carefully these travellers were making their investigations and to what great degree of confidence we can accept their observations. With reference to the particular point which is engaging our attention, what has just been transcribed makes it very difficult, if not quite impossible, to adopt Mathews's argument. The King Island's adult Emu was "quite black." Therefore it is not there that the "White-breasted Emu," which was supposed by Mathews to be in existence in Péron's time, will ever be found. Therefore, the only argument to make one of the birds in Lesueur's plate to be considered as originally from King Island falls to the ground through this very fact. On the contrary, there are powerful reasons in support of the inverse thesis—that is to say, that the birds represented in the plate could not have come from this island.

Lesueur's drawings were made from living animals. Péron says so expressly, and, as for the plate in question, Mathews himself acknowledges it, so much does the mien of the drawn subjects make it evident. Beside, the plate of the "Voyage" is not the only iconographical document in our possession. There are also from Lesueur's pencil a certain number of sketches devoted to the Emu. All relate to the same species. The care given by the artist to the drawing of the feathers of the head, his insistence in drawing always the attention to this detail by means of foot-notes, show that he tried each time to reproduce his model very exactly, and, above all, the characteristics which he thought peculiar to it. Indeed, these sketches are sufficiently alike to make it impossible to conceive that they could represent different species or varieties; they look even as if they had been drawn from the same specimens. Here is the enumeration of these sketches:—Browsing Emu (Bibliothèque du Muséum de Paris); two Emus—one lying down, the other standing (Bibliothèque du Muséum de Paris); Emu's head—full face and profile; leg (foot), (Bibliothèque du Muséum de Paris); drawing partly reproduced in their notes by Milne-Edwards and Oustalet; Emu standing (Bibliothèque du Muséum du Havre); Emu lying down (Bibliothèque du Muséum du Havre).

Not only have all these sketches been drawn from living birds—as is shown by the naturalness of their attitudes—but also from not very timid animals, some lying down, others browsing; only domesticated animals could be so quiet, and there is every reason for thinking that the models were precisely the three birds captured at Kangaroo Island, and which, brought alive to the Museum, lived there several years. In any case, these sketches could not have been made at King Island, where our travellers did not see any Emus in a wild state, and alive, as this has been proved. This point is important, since among these drawings are to be found those which served for the Plate XXXVI. of the account of the journey, and they are the last two of the preceding enumeration.

Let us see now if an examination of these drawings will allow a little light to be thrown on the colouring given in this plate to the chest of one of the subjects—the “White-breasted.” In the original drawing by Lesueur the bird is exactly in the attitude shown in the plate, and dimensions are absolutely alike. The head and the bare part of the neck are very finely drawn and well finished; the rest of the body is much less carefully drawn, and single strokes indicate here and there the general direction and the thready aspect of the feathers. These strokes are more numerous and thicker on the fore part of the neck and adjoining part of the back and over the whole outline of the animal, which they silhouette in some sort; elsewhere they are very scarce, their scarcity, or even their absence, leaving large bare spaces in the drawing. One of these stretches on the side and the lower part of the neck, and it is, it seems, a false interpretation of this bare space by the engraver which caused him to give to the bird the whitish aspect of its neck. I shall add, as a secondary detail, that the feathers of the neck are much finer and longer on the original drawing than on the engraved plate.

The second sketch in the *Bibliothèque du Havre* represents the bird lying down in the plate. It is much less finished than the previous one. Only the head is carefully drawn—the rest of the body is simply outlined; moreover, a few strokes show that at the lower part of the neck the feathers formed a sort of projecting hood, more voluminous than is shown in the plate.

Another point to which attention was not drawn, and which deserves, nevertheless, to be examined closely. It may, supposing a white-breasted Emu ever existed, make us understand what it was—I mean the dimensions of the birds in Lesueur’s Plate XXXVI. The drawing, says the explanation, is to the scale of one-tenth, which gives to the bird standing (the male) the following height above the ground:—

Total height	...	...	...	130 cent.
Height of the back	...	...	...	90 „

These are dimensions much more considerable than those of the specimen whose skin is mounted in the Museum galleries—the

type of the species, one of the Emus brought back by the Baudin expedition from Kangaroo Island. It measures:—

Total height ...	...	...	...	86 cent.
Height of the back ...	...	...	...	66 „

But the one lying down on the plate, the female, is considerably smaller than the other. The two birds being in different attitudes, it is fairly difficult to compare their height; however, in the plate or in the original sketches one and the same dimension may be measured on both subjects, that which may be termed the length of the trunk from front to back: it is about 90 centimetres for the female, as against about 120 for the male, or three-quarters. If we admit that all the dimensions are in proportion—and this should be approximately true—we obtain the following heights for the female:—

Total height ...	...	...	...	96 cent.
Height of the back ...	...	...	...	66 „

We find, then, that the second of these heights measures exactly the same number of centimetres as the skin mentioned above. It is, besides, the only important height—the only one which changes but slightly in the various attitudes of the bird when standing, while the other, the total height, varies considerably with the position of the head and neck. From all that precedes, we may deduce the following conclusions—the only ones which, it seems to me, are logical and permissible:—

1. All the indications of the legend on Plate XXXVI. of the “*Voyage de Découvertes aux Terres Australes*” (“*Voyage of Discoveries in Austral Lands*”) are exact—locality, indication of sex, dimensions, &c.

2. The Emu of Kangaroo Island presented a sexual dimorphism fairly well accentuated, especially in the more considerable dimensions of the male, and this in conformity with what was shown by his congeners of King Island. Were there also differences of plumage in the two sexes? It is possible.

3. The specimen whose skin is preserved in the Museum is a female; but among the living individuals brought back the other sex must have been represented, since Lesueur has also drawn a male. Now, the skeletons of the two individuals brought over at the same time as the preceding have been preserved—the one we know is in Paris, the other in Florence—and each bears inscribed on its very bones, in old handwriting, the indication, “*Casoar, male.*” Let us compare, in these three birds, what may be compared—the length of the tarso-metatarsus and that of a digit (the specimen whose skin has been preserved and mounted still possesses the bones of these parts):—

			Tarso-Metatarsal.		Medial Finger.
Skeleton, ♂, Paris	...	...	280 cm.	...	116 cm. *
Skeleton, ♂, Florence	...	...	240 „	...	106 „ *
Skin, ♀ (?), Paris	...	...	195 „	...	100 „ †

* The horny covering of the ungual phalanx is absent.

† The horny covering of the ungual phalanx is present. Its length is included in the measurement given.

Although expressing the existence of a fairly great variableness in the dimensions of the males, these figures are not opposed in any way to the adoption of the thesis sustained here, since the third bird, the one that I consider a female, is still much smaller than the smaller of the males.

The skin in the museum being indeed that of a female, Lesueur has then had for a long time under observation tame Emus belonging to both sexes; he has been able, consequently, to represent both with the greatest exactness, and to make evident the differences which he could point out. Among the latter did there exist a difference in the colour of the breast plumage, that of the males being whitish? No room is allowed for dispute on this question, since precisely the only skin that remains to us is that of a female. Another interpretation of the colouration given to the breast of the male on the plate of the "*Voyage aux Terres Australes*" is, besides, possible—that which is given above.

4. In the actual state of our knowledge, there is no reason to believe that there existed, in an age near our own, two Emus on King Island. The appellation "*Dromaius spenceri*, Mathews," is without object, and should be struck out of the nomenclature. The expression, "*Dromaius minor*, Spencer," should alone subsist, and be applied to the sub-fossil bird—the one, doubtless, which Péron and his companions have again seen. Now, was the Emu of King Island different from that of Kangaroo Island? With the only remains that we possess of each of these birds it is impossible to affirm it; but what we do know in a general way from the specialization of the isolated forms in the two islands allows of our believing this to be so.

Stray Feathers.

Eggs of *Puffinus sphénurus*.—Mr. E. S. Rohu, of Sydney, writes :—As a possible record, "the following may prove interesting to the ornithological world. On 29th December, 1912, while on a camping trip to Broughton Island, New South Wales, I opened up several burrows in the rookeries of *Puffinus sphénurus*, and amongst them I was fortunate enough to take *Puffinus griseus* and eggs. This, I believe, is the first record of its being taken breeding in Australia. The specimen and eggs are now in the collection of Mr. H. L. White, at Belltrees."

* * *

Bird Protection in Queensland.—Dr. Hamblyn Harris, local secretary of the R.A.O.U. for Queensland, has sent a copy of a proclamation concerning bird protection that may cause ornithologists in the older States to look to their local proclamations, with a view to advancing their State to the level of Queensland in this important matter. The State has been divided into two districts. There is a fine list of birds absolutely protected

throughout Queensland (Schedule A), and birds partially protected throughout Queensland (Schedule B), a much smaller list. The close seasons are, for the northern half of the State, from 1st September to 31st March, both days inclusive; and for the southern half, from the 1st November to the 31st May, both days inclusive. It is hoped that some of the birds on the already small partially protected list will be placed on the absolutely protected list. Such birds as Bronze-winged Pigeons, Bustards, Mallee-Fowl, and Brush-Turkeys do no harm, and are already becoming rare. They are amongst the world's famous birds, and should not be allowed to become extinct. A good list of reserves within which the destruction of native birds is prohibited during the whole year completes a valuable proclamation. Queensland bird-lovers are to be congratulated on the success of their efforts and the wisdom of their Government.

* * *

Coachwhip-Birds Observed.—At the head of a gully on the Blacks' Spur, Healesville, Victoria, I had the pleasure of seeing openly not fewer than eight Coachwhip-Birds (*Psophodes crepitans*) in one group, and several of them making the call that gives them their name. Two (presumably males) were fighting fiercely; the others provided an agitated audience. Owing to the fire, there was no cover, and every movement was visible. One fighter pursued the other from branch to branch of the bare saplings, and finally across the road, passing between another member of my party and myself. Their actions were very rapid, but it was possible to note the deep green of the plumage, the white cheek patches, and the crest. The birds rested within 10 feet of me, and in full view, and one gave the full whip call—the swing of the lash and the crack. Immediately one of the group left on the other side of the road (also in full view) added the jerky call that is sometimes heard from these birds. We stood between the producer of the first call and the producer of the second. I watched the one bird and my friend the other, and we *saw* them produce the notes. Again and again one or other of the birds called, and several times we witnessed the production of the notes. In every instance one bird was responsible for the whole of the call usually associated with the Coachwhip-Bird—the lash and the crack—and another gave the rarer following note.—R. H. CROLL. 15/4/14.

* * *

Notes from Wangaratta District.—In the district about the Carraragarmungee school the nests of both *Merops ornatus* and *Pardalotus punctatus* are tunnelled on a downward slope, possibly on account of the rainfall not being very heavy. Occasionally I find a verandah-like projection over the entrance to the nest of the latter species. Last year a young Pallid Cuckoo (*Cuculus inornatus*) was discovered in a nest of the Bee-eater. How it got there I cannot say. The slope of the excavation probably

helped the egg to roll inwards. As the Cuckoo grew, it came nearer to the entrance. Becoming still larger, it had to leave the nest. It rested on a ledge near by, and effectually prevented its foster-parents from entering the tunnel so long as they had dainty morsels in their beaks. It remained on the ledge at night, and stayed in the vicinity until it was a large bird.

A family of Blue Wren-Warblers (*Malurus*) had a nest in some asparagus fern on a verandah. Four young ones were reared, and a second clutch of eggs was laid. When these hatched, the first brood helped the parents to feed the second. They became so tame that one could almost touch them as they flew to and fro on their unselfish errands. Blue Wrens have been seen in full plumage throughout the winter. One male was seen for a few days with a greyish-black head, with a few tiny blue feathers; soon, however, it assumed the full cobalt colour. On the 1st September I saw a young one just beginning to assume the blue collar. This year the Whitefaces (*Aphelocephala*) built early, and young ones were found on the 28th August. The nest was composed simply of grass, in the base of a "pipe" stem in a gum-tree.—MURIEL CHENEY. September, 1914.

* * *

A Long-lost Bird.—Australian ornithologists especially must be very interested at the re-discovery of John Gould's long-lost bird, *Xerophila pectoralis* (*Ann. Mag. Nat. Hist.*, series iv., vol. viii., p. 192, 1872), and known now as *Aphelocephala pectoralis* (Mathews's "A List of the Birds of Australia," p. 246, 1913). This bird was described from a single specimen supposed to have been collected near Port Augusta, S.A. Dr. Morgan, Dr. Chenery, and myself have hunted the country for hundreds of miles round Port Augusta, but without success. Last year Mrs. White and I covered 1,300 miles in our trip north of Oodnadatta, but did not see a sign of the bird, although *A. nigricincta* and a bird closely resembling *A. p. castaneiventris* were met with in numbers. On 29th June, 1914, when between 30 and 40 miles west of Oodnadatta, Mr. J. P. Rogers, my collector and assistant, brought me two small birds and asked what I thought of them. I at once recognized the long-lost bird, and within a few hours procured several specimens myself. They were in the company of *A. nigricincta* and appeared like *A. p. castaneiventris*; they resembled these much in their habits, but their call was different, and they were much more timid. When alarmed they flew straight away out of harm. The call is a plaintive, low whistle, resembling a little the animated twittering note of other members of the genus. This species appears to be confined almost entirely to the table-land country, which is covered with loose gibber stones, with a few scattered low bushes. In the dry water-courses patches of mulga (*Acacia aneura*) grew. A few points of rain fell over this country last February, and evidently these birds nested, for the parent birds were in company of their fully-fledged young. As far as

I could tell, the species ranged up to about 100 miles west of Oodnadatta. As soon as the table-land country ended, and sandy country came in, they disappeared, as well as *A. nigricincta*; but the variety resembling *A. p. castaneiventris* was plentiful all through the country, be it sand or stone.—(CAPT.) S. A. WHITE, M.B.O.U. Adelaide, 9/9/14.

From Magazines, &c.

Destruction of Birds.—In a booklet, entitled "The Plumage Bill—What it Means," Mr. James Buckland describes some of the horrors of the traffic in plumage. Dealing with the economic aspect of the question, he says:—"Yet, notwithstanding the mass of testimony that has been published everywhere to the effect that bird-life is the most indispensable balancing force in Nature, and that it must be recognized as a very important adjunct to the successful farming operations which meet the food and clothing requirements of mankind, the millinery interest is still permitted to stretch out its tentacles, like a giant devil-fish, to the four corners of the earth, and steadily, relentlessly, to draw in the skins and feathers of every one of these feathered guardians of the welfare and the happiness of the human race."

* * *

Ornithological Journal.—*The South Australian Ornithologist*, vol. i., part 2, is to hand. It contains the first instalment of "A Sketch of the Life of Samuel White—Ornithologist, Soldier, Sailor, and Explorer, by his son, S. A. White." No name indicates to whom ornithologists are indebted for an interesting account of the Southern White-plumed Honey-eater (*Ptilotula penicillata whitei*). Captain White, drawing on his extensive field experience, contributes "Field Notes on *Virago castanea* (Eastern Teal) and *Virago gibberifrons* (Grey Teal)." He states "that there is not a shadow of doubt . . . about there being two distinct species." In "A List of the Birds of Australia" Mr. Gregory Mathews has given only one species, under the name *Virago castanea*. Dr. A. M. Morgan supplies notes on bird visitors to his garden at North Adelaide during two and a half years.

* * *

"The Australian Zoologist."—*The Emu* cordially welcomes the first part of the first volume of *The Australian Zoologist*, issued by the Royal Zoological Society of New South Wales, and edited by Allan R. McCulloch, Zoologist, Australian Museum, Sydney.

Besides the report and balance-sheet of the council of the Society for last year (1913), the part contains a series of articles of interest to the zoologist, and three of special interest to ornithologists. A suggestive article on "The *Mallophaga* as a Possible Clue to Bird Phylogeny," by Launcelot Harrison, B.Sc., will stimulate ornithologists. Mr. Harrison is a well-known field

worker, and was a member of the R.A.O.U. camping party on the Capricorn Group. Some strange possibilities are suggested. Mr. Harrison says:—"The genus *Læmobothrium* is found upon diurnal *Accipitres* and upon a number of water-fowl, which, in the ordinary course, might form the food of the larger Hawks. The position of the *Accipitres* is entirely unknown. Possibly there is a phyletic connection between them and the water-fowl." It is interesting that these parasites seem likely to throw light on the relationship of the ratite birds. Mr. Harrison says:—"Of the parasites of the Struthionies, *Degeeriella asymmetrica* is found upon the Emu, *Lipeurus asymmetricus* upon two species of Rhea, and *Lipeurus quadrimaculatus* upon the Ostrich, and also upon a species of Rhea. These three species (of insects) are undoubtedly congeneric. . . ." Mr. Harrison, referring to other *Mallophaga*, says:—"In default of any better explanation, I submit that these facts of distribution point to the Sphenisciformes (Penguins) having an ancestral stock in common with the Tinamiformes (Tinamous of South America), Galliformes (fowl-like birds), and Columbiformes (Pigeons). It would follow from this that the Penguins have undergone a comparatively recent and rapid specialization to an aquatic life, and are not such an ancient and lowly group as they have generally been considered." There is undoubtedly a promising field awaiting examination in the distribution of the biting lice (external parasites) of birds and some mammals.

Mr. Basset Hull has a short note on "Bird Sanctuaries." He stresses the necessity for adequate supervision. He also appeals for the amendment of the law so as to "protect all birds other than game or noxious birds." The suggestion, which all ornithologists and nature-lovers will approve, is made that "'Game' birds should be restricted to those actually of a substantial food value." He says:—"Many birds, hitherto regarded as 'noxious,' might safely be protected, for the good they do far outweighs the mischief they occasionally wreak. All the Kites, Hawks, and Eagles are such keen and active destroyers of vermin" that they should be protected. Even the Crow should be "protected in all coastal districts," and the Cockatoos, Parrots, Silver-eyes, and other much-maligned birds should be afforded the protection enjoyed by the average human criminal, and only punished when caught in the act of destroying fruit and crops. Mr. W. W. Froggatt, F.L.S., contributes some interesting "Bird Notes" on Galahs, Emus, and Apostle-Birds. He also refers to the bad effects of the use of poisoned water by the squatters in dealing with rabbits. He says Doves, Bronze-winged Pigeons, and Apostle-Birds suffered most.

* . *

Bird Distribution.—"Ecological Relations of Bird Distribution" is the title of an article by S. E. Brock published in the July (1914) issue of *British Birds*.

"It is sufficiently obvious," the author states, "that the avifauna of a given country is distributed neither accidentally nor uniformly; its dispersal is, on the contrary, both definite and uneven. Despite their exceptional mobility, birds are essentially local; the 'universally distributed' species is at most universally distributed only within the limits of a uniform environment. In one sense, and from one aspect, the environment may be said to determine the avifauna. The localization of birds is directly related to the localization of environmental types. Since this is so, an accordant classification of the phenomena of distribution seems to be necessary to a full illustration of the whole subject. But the term environment stands for a complex of varied and intricate factors, with differentiated reference to the fauna, and the preliminary difficulties arise in the search for the dominant or immediate agents in dispersal. The local existence of a bird as a breeding species is dependent upon the local conjunction of certain environmental units; and distribution is uniform in proportion as these essentials are uniformly and evenly dispersed. A shortage in one direction is not balanced by superfluity in another. The specific range is necessarily contained within the region of efficient food supply; but it is of equal necessity contained within that of suitable climatic conditions, and within that of nesting-ground. A sufficiency of food and the necessary climatic conditions do not permit existence if nesting-ground is absent; an abundance of food and nesting-ground is useless if the meteorological conditions are inimicable. Where the requisite conditions are unequally distributed in space, or relatively unequal in supply, there the dispersal of a species will be correspondingly uneven, limited by the most local, or the least adequately supplied, of the essentials. In the case of many birds, an increased supply of nest-sites is alone sufficient to allow of an increase in population, which implies that the possible maximum is normally not attained through a relative shortage of nest-sites. In such instances, distributional range is co-extensive less with food-supply than with nest-sites. The latter is, therefore, so far the limiting factor in distribution. If a common limiting factor exists, and can be recognized, then on it a classification of the facts of distribution might be conveniently based. But this can hardly be looked for; a varying supply of varying needs must be expressed by a limiting agent differentiated according to species. Nevertheless, it appears probable that this differentiation is confined within relatively narrow limits. The governing or limiting factors in bird distribution, apparent in part through direct observation and comparison, are perhaps thrown into clearest relief in the phenomena of range-extension—which process may be graded separately in degree as it represents predominantly either (1) the colonization of new areas ecologically homogeneous with those of origin, or (2) extension of range involving adjustment to new environmental conditions. Theoretically, extension may be due to such features as numerical increase, or to environ-

mental change, or to removal of a barrier (objective or subjective) hitherto preventing access to the new areas; but the immediate point is less the origin, than the method and progress, of range-extension. In spreading, a species seeks preferably its natural habitat—that is to say, the colonization of new areas ecologically coincident with those of origin tends to precede the colonization of new *environments*; and the rate of increase and spread will depend less directly upon fecundity than upon the extension of the necessary environmental conditions. In this country the Tufted Duck has shown a tendency to increase more rapidly, and to spread more widely, than the Pochard; but the discrepancy between the species is probably more nearly related to an unequal supply of their respective ecological requirements than to unequal fecundity. Environment guides and controls, even where it does not originate, increase.”

* * *

Birds at Lighthouses.—An interesting article, entitled “Round the Lighthouse Lantern,” is published in the summer, 1914, number of *Bird Notes and News*, the journal issued quarterly by the Royal Society for the Protection of Birds. Following are extracts:—

“Perhaps none of the many branches of the work undertaken by the Royal Society for the Protection of Birds—not even the salvation of the solitary Raven and fairy-like Roseate Tern from the collector, or the attempt to save the aerial Linnet from the bird-catcher, or the awakening of sympathy and love for nature in school children—appeals to the general public so directly as does the preservation of migratory birds at the lighthouse. . . . Rather more than a year ago the Society started, at the annual meeting in 1913, a special fund for the protection of migrating birds. The history of the movement has been told in a previous number of *Bird Notes and News* (March, 1913). A tremendous loss of bird-life results from the fatal attraction of the lighthouse lantern; it had long been deplored, but was supposed irremediable. The birds, it was said, flew at the dazzling light like moths at a candle, and, dashing against the lantern, were killed or stunned, and fell into the sea or into the lighthouse gallery. A Dutch naturalist (Mr. Thijsse), however, held that only a small proportion were lost in this way, and that the majority merely flew, dazed and weary, round and round the incomprehensible gleam until they dropped down exhausted. During three years he tested plans for providing resting-places for the small travellers round about the bewildering rays, and at the end of that time he was able to report that the loss of bird-life at the great Terschelling Light had been reduced from thousands in a night to something like a hundred in the whole migration season. The Royal Society for the Protection of Birds entered into correspondence with Mr. Thijsse, obtained from him all particulars of his invention, and

sought an interview with the authorities of Trinity House. Here they met with most courteous hearing and with permission to have the scheme tried at one or two British lighthouses, the engineers of Trinity House to carry out the work according to the Society's plans and at the Society's expense. St. Catherine's, in the Isle of Wight, and the Caskets, off Alderney, were selected for the experiment. The plan and details of the apparatus had to be adapted and altered for the purpose, and this entailed not a little skill and labour, as the shape of the construction of the building had to be considered. Moreover, it was essential that the light seaward should be in no way interfered with, and perches in the dark were comparatively useless, since the birds are apparently unable to use these. Mr. Thijsse's co-worker, Mr. Burdet, came over from Holland to visit the installation at St. Catherine's in company with members of the R.S.P.B. Council. The autumn migration is not greatly affected at the lighthouses already chosen, the birds being then mostly outward bound; but the reports received at the end of 1913 were satisfactory. The keepers stated that large numbers of birds had settled on the rests on many nights, and expressed the opinion that the lives of considerable numbers must be saved, because they did, undoubtedly, as Mr. Thijsse had said, flutter round about the light, and when they found the perches, would remain on them until dawn.

"The spring of 1914 was exceptionally favourable to migrants arriving on the English coast, owing to the fine clear nights prevalent in April and May. The occasions of mist and cloud and rain were, however, sufficient to prove beyond doubt the value of the scheme. Thousands of birds on these nights, instead of fluttering on weary wings about the baffling light, discovered the long line upon line of perches, and crowded upon these until, with the break of morning, they could safely take wing once more and find the land in whose green woods and hedgerows they were born. It was a strange sight, the lighthouse-keepers told with evident interest to members of the council, to go into the gallery at night and see these little birds—thousands of little birds—huddled together thickly wherever places could be found, birds of many species and varying sizes, but all alike in their strange passion to reach their native place—some quickset hedge, some primrose-starred wood, some lichen-tinted barn—and in their tiredness of wing and their longing for light and rest. It was, said one witness of the scene, the most wonderful sight he had seen in his life. . . . The installation of bird-perches and resting-places at a lighthouse costs, in the first place, from £60 to £100, according to the work required, and the running expenses will probably amount to from £10 to £15 a year each. For cleaning and other purposes the perches and resting-places have to be taken down and re-erected after and before each migration—that is to say, twice a year—and the labour involved is considerable, especially at lighthouses which stand out at sea."

Ornithological Club's Achievements. — The Cooper Ornithological Club, which publishes a bi-monthly journal, *The Condor*, is a comparatively young society, but it has had a most successful career. In the May-June (1914) issue of *The Condor* appears the president's (Mr. Harold C. Bryant) address, which was delivered at the Northern Division meeting of the Club, in March, 1914. He gives a history of the Club, and deals with ideals and so forth. The following extracts are of special interest:—

"The purposes of the Cooper Ornithological Club, as stated on its official letter-heads, are as follows:—For the observation and co-operative study of birds, because of the resulting pleasure; for the spread of interest in bird study, so that this pleasure may be shared by others; for the conservation of birds and wild life in general, for the sake of the future; for the publication of ornithological knowledge, as being a contribution to science. These, then, are our ideals. Every member should be acquainted with these ideals and do his best to further them, or else the Club fails of its objects. I am sorry that I cannot discuss each one of the four. This being impossible, I have done the next best thing and attempted to treat in detail of one phase of the work of the Club. It deals, perhaps, more closely with the last-named object—the publication of ornithological knowledge as being a contribution to science, but it has ramifications which necessarily include the other objects above mentioned. It is on the Cooper Club member in relation to scientific work that I wish to speak. If we follow the general trend of the research work carried on by members here in California we find that it can be classified as follows:—(1) Collecting of bird skins, nests, and eggs; (2) preparation of local lists; (3) recording of field observations, such as migration and nesting dates, and habits; (4) systematic descriptions of new species and races and systematic position of groups; (5) photography; (6) faunistics, or the study of distribution; (7) economic investigations; (8) conservation of wild life.

"The study of plumage cycles forms a field almost wholly neglected. We do not know the sequence of plumages even of some of our commonest Ducks. Let the collector of bird skins specialize, therefore, and, by obtaining a complete series, place before us the information necessary to fill in this gap in our knowledge.

"The variation in size, shape, colour, and colour pattern of the eggs of a particular group of birds furnishes an intricate problem and one worthy of more attention than it has as yet received. Nor have we exhausted the possibilities as regards the finding of yet undiscovered nests and eggs. The nest and eggs of the Harlequin Duck, Saw-whet Owl, and Crossbill have never been taken in California, although these species are known to breed within the State.

"Here, then, are two important problems which claim the attention of him who follows that instinct which is so strong in most of us—that of making collections, be they of birds, birds' nests, or birds' eggs, or all three.

"If there is anything in our work that we have possibly overdone, it is the plain faunal list. No worker in ornithology will for an instant underestimate the value of the faunal list. Nevertheless, he must admit that the value of such a list increases in proportion to the annotations. The mere locality list of species is of prime importance only when it comes from new localities, and not all of us are able to seek out such. The annotated list, on the other hand, seldom affords a duplication, and always offers a comparison of life-history notes. It also has historical value, for it usually affords basis sooner or later for a study in the change in the status of birds. AVIFAUNAS of the type of Willett's "Birds of the Pacific Slope of Southern California" and Tyler's "Birds of the Fresno District" must be held up as models of the kind of work most needed. They give authoritative facts about the birds of the district treated, and are extremely useful. Such AVIFAUNAS should be printed in large enough numbers so that they can be furnished to every interested school teacher and student of birds in the district covered.

"In spite of the fundamental need for the services of the man who attempts to put in systematic order our knowledge of the relationships of birds, the old type of systematist is passing away. Apparently the lure of modern biological problems, in which the immediate bearing is more clearly seen, deters many from remaining in this field. The man who improves our classification and nomenclature lays the foundation without which the so-called higher types of investigation cannot be carried on. Just one case in point: The present trend of investigation on the origin of species—the problem which has longest interested the biologist—towards the isolation theory awaits a more dependable classification of animals at the hand of the acute systematist at this very moment. We may have come to the point where the description of a new species is seldom justified; but the extent of variation, intergradation, and geographical distribution of our different species furnishes problems to the systematist that are most important. Biologists are describing about 10,000 new forms annually. Whatever may be said as to the advisability of such a proceeding, it gives us an idea as to what an immense field the biologist has in which to work.

"We are at the present time seeing just the beginning of a new science which deals with the relation of animals to their environment, and this science we call ecology. The ecologist must necessarily depend almost entirely upon the systematist for workable material. Here, then, is a plea for men who are willing to remain below ground, as it were, out of the light while they lay the foundation. Current recognition may not give due credit to the systematist, but time will prove the worth of his service.

"Of recent years a new type of naturalist has joined our ranks—namely, the camera hunter, or, more properly, the hunter with a camera. It is needless to point out that nothing has been more useful in promoting interest in and diffusing knowledge

about birds than the photograph. Many a reader of a magazine, be it ornithological or otherwise, will imbibe what knowledge he can by looking at the pictures, even though he never takes time to read a text description. Pictures leave a more lasting impression than does descriptive writing. Let me also call to your attention the fact that good photographs are practically as reliable in establishing records as are skins."

Review.

[“A List of the Birds of Australia,” by Gregory M. Mathews, F.R.S.E., F.L.S., F.Z.S., M.B.O.U., R.A.O.U., &c., author of “The Birds of Australia”; containing the names and synonyms connected with each genus, species, and sub-species of birds found in Australia at present known to the author. Witherby and Co., 326 High Holborn, London, W.C. 1913.]

THIS, the third list of Australian birds already issued by Mr. Mathews, shows that his enthusiasm in the study of the Australian avifauna is unabated. “A Reference-list to the Birds of Australia,” by Mr. Mathews, published in *Novitates Zoologicae*, vol. xviii., 1912, was so surprising as to the lumping of genera and the splitting of sub-species that many ornithologists felt the need of an authoritative list of Australian birds. Soon Mr. Mathews asked the Council of the R.A.O.U. to contribute towards the expense of publishing a new list. The Council, being committed to the preparation and publication of its “Official Check-list of the Birds of Australia,” could not comply with that request. Nevertheless, Australian ornithologists heartily welcomed Mr. Mathews on his recent visit to Australia, and were pleased to see a first copy of “A List of the Birds of Australia.” Meetings were arranged, and Mr. Mathews addressed ornithologists on the important question of nomenclature. He impressed on all he met *the desirability and possibility of uniformity of bird names*. The desirability of uniformity of names is cordially approved by Australian ornithologists.

An examination of “A List of the Birds of Australia” shows that his treatment of genera is, however, perhaps even more revolutionary than it was in the “Reference-list.” There Mr. Mathews “lumped” genera until he reduced the 336 Australian genera admitted in his “Hand-list of the Birds of Australasia” to 276, and also indicated that this number was to be further reduced, for he stated, in the introduction to the “Reference-list”:—“As regards genera, I . . . have admitted the majority of those used in the ‘Hand-list,’ only eliminating a few* which I have concluded, from ample material and after careful consideration, to be unnecessary. I, however, do not regard many of those now employed as worthy of generic rank, and anticipate their relegation to the ‘unemployed list’ when working the groups for my ‘Birds of Australia.’” Yet very soon afterwards Mr.

* Mr. Mathews combined with others about 60 Australian genera recognized in his “Hand-list.”

Mathews not only reversed his opinion, formed "from ample material and after careful consideration," but increased the number of genera of Australian birds from 276 to 495. Mr. Mathews thus first reduced the number of genera by 18 per cent., and then shortly afterwards increased the number of genera recognized in the "Reference-list" by almost 80 per cent. If, pendulum-like, he swung too far on the side of reduction in the "Reference-list," is it not possible that he has swung too far on the side of increase in "A List of the Birds of Australia"?

The number of genera (495) for 666 species is large; each genus contains on an average only 1.3 species. 381 (76.9 per cent.) of the genera contain one Australian species each; 82 (16.5 per cent.) contain two Australian species each; and only 14 (2.8 per cent.) contain more than three Australian species. Some of the generic names used by Mr. Mathews in "The Birds of Australia" and *The Austral Avian Record* appear in the new list as synonyms. This is, in some cases at least, probably due to the awaiting of an official opinion from the International Commission on Zoological Nomenclature. It is noted that *Ypsilophorus*, proposed as a substitute name for *Synoicus* (antedated by *Synoicum*), is listed as a synonym. *Mimela* (1827) was possibly forestalled by *Mimetes* (1826), and Mr. Mathews has again placed his proposed substitute name as a synonym. "One-letterism" is a troublesome question. *Apus* (a Swift, not a crustacean), *Apis* (the bee), and *Aphis* are well-known names in zoological literature. If the Commission should decide that only one of these names can be used, confusion must follow; and this is only one instance.

"The A.O.U. Check-list of North American Birds," third edition, has 229 of the 801 species divided into sub-species and 625 North American birds are named trinomially. Mr. Mathews has eclipsed these figures in "A List of the Birds of Australia." He has divided 483 of his 666 species into sub-species, and has named 1,426 Australian birds trinomially—more than double the number so named for North America in the A.O.U. "Check-list." Over 80 of the trinomial sub-specific names of the "Reference-list" appear in the new list as synonyms, and 77 of about 230 new sub-specific names published in *The Austral Avian Record* during the short time between the publication of the "Reference-list" and the completion of the new list are reduced by their author to synonyms. The large number of synonyms—about one-third of the whole in the case of those first published in *The Austral Avian Record*—is at least indicative of Mr. Mathews's candour and determination to make his work as perfect as possible. Probably it also indicates that finality has not yet been reached.

With regard to birds, there is not much difference between the "Official Check-list of the Birds of Australia" and Mr. Mathews's new list. One interesting case is the Grey Teal. Captain S. A. White, the well-known Australian field worker, in the last number of *The South Australian Ornithologist*, supports the R.A.O.U. Check-list Committee in approving the undoubted

claim of this bird to be considered a good species. Mr. Mathews included it in the "Reference-list," but rejected it in his new list. The dark and white forms of the Reef-Heron are named as two separate species by Mr. Mathews in his new list, and are considered one species in the "Official Check-list." Time and more material will settle the point.

One good result of Mr. Mathews's continued efforts is already apparent. Australian ornithologists are more clearly realizing that the ornithology of Australia is but a part of ornithology generally. They realize that their work must fit in with that done in other countries. Mr. Mathews's new list emphasizes the close relationship of some of the birds of Australia to those of neighbouring lands, for more than 130 Australian species of birds are listed as geographical races of extra-limital species.

The thanks of ornithologists are due to Mr. Mathews for the enormous amount of time, energy, and money he is spending in his endeavours to produce a complete work. It is evident that he considers no expenditure of time or money too great so long as a doubtful point remains to be cleared up. He has set himself so high a standard, and is so candid and critical of his own work, and so determined to have it, in his own opinion, just right, that he is a far keener critic of that work than any other ornithologist is likely to be. Mr. Mathews claimed something approaching finality in the "Reference-list" when he wrote in the introduction:—"I do not claim that the nomenclature in this list can be accepted as final; but I can confidently state that the emendations and alterations will be comparatively few." Yet in "A List of the Birds of Australia" Mr. Mathews himself has made "emendations and alterations" which total many hundreds.

Ornithologists look forward to the day when finality will be reached in bird naming. British ornithologists can rest assured that their Australian *confrères* will see to it that Australia stands in line with the rest of the Empire in this matter, as it does in matters national and imperial. The present, in both arenas, is a time of uncertainty and trouble. In Australia the R.A.O.U. used officially in its journal, *The Emu*, names according to Mr. Mathews's "Hand-list of the Birds of Australasia," which was based on Dr. Sharpe's "Hand-list of Birds." Mr. Mathews himself superseded his "Hand-list" in 1912 by "A Reference-list to the Birds of Australia"—a work so unsatisfactory to himself that he almost immediately proposed another list, which has now been issued. Meanwhile, the Council of the R.A.O.U. pressed to completion the work taken in hand ten years ago of the issue of the first edition of the "Official Check-list of the Birds of Australia." The "Hand-list" is no longer available; the "Reference-list" has been superseded. "A List of the Birds of Australia" is revolutionary, and certainly not final, for the author, even before he left England, altered names of birds in the concluding parts of vol. iii. of "The Birds of Australia," and, further, his visit to Australia provided him with additional material. Mr.

Mathews has now proposed to the Council of the R.A.O.U. that it should accept, as its official check-list, a revised edition of his latest list. The Council has replied that it is considered that the present time is not opportune for the issue of a second edition of the "Official Check-list." Apparently nothing approaching finality is yet in sight as regards the naming of Australian birds.

How are Australian ornithologists to name birds until this troublous time is passed, and a second edition of the "Official Check-list" is issued? The Council of the R.A.O.U. has decided that the editors shall use in *The Emu* the names according to the "Official Check-list of the Birds of Australia," and shall, if the author of a paper desires it, insert in a bracket following the "Check-list" name the name according to Mr. Mathews's "A List of the Birds of Australia." Thus official recognition is again being given to the painstaking efforts of Mr. Mathews. Though Mr. Mathews stated that his desire was for uniformity in naming, his treatment of cosmopolitan groups, such as the diurnal birds of prey and the *Charadriiformes*, is very different from that of the committee of ornithologists who prepared "The A.O.U. Check-list of North American Birds." It remains to be seen whether the committee of the British Ornithologists' Union that is now preparing an official list of British birds has adopted the fine distinctions used by Mr. Mathews in the latest list, which is so very different from his "Reference-list," published in 1912.

Concerning the important question as to whether the names now used by Mr. Mathews will be accepted by ornithologists, he, with his accustomed candour, quotes, in the introduction of his new list, the following "plain-spoken" criticism:—"Mr. Mathews's extreme views upon generic subdivision bring into use many names usually relegated to synonymy, and these, together with the new ones which he proposes, will provide names for almost all, if not the whole of the groups of *Charadriiformes* that can possibly be differentiated. Whether his nomenclature will be followed by others is open to question. His aim to be consistent in the amount of differentiation necessary for the recognition of a separate genus is praiseworthy, but consistency in judging questions of degree of difference involves the personal equation, and can only be settled by the vote of a committee." Mr. Mathews adds:—"To which, after the word 'committee,' should have been added, 'who have all equally and fully studied the group in question.'"

Two facts must be noted—(1) Mr. Mathews, as regards genera, went to the other extreme in the "Reference-list"; (2) his treatment of the *Passeriformes* is similar to that of the *Charadriiformes*, for, in "A List of the Birds of Australia," he has divided the 305 species of Australian perching birds recognized by him into not fewer than 206 genera. His treatment of the genus *Pachycephala* is instructive. The genus *Pachycephala* of the "Reference-list" consisted of four genera of his "Hand-list" "lumped" together. It has now been subdivided into 12 genera, containing

a total of 14 species. No wonder that many are hoping for finality!

We look forward with interest to the continuation of Mr. Mathews's strenuous labours. It seems probable that, in his zeal for the best, he will publish one or more additional lists of Australian birds, ere he succeeds in satisfying himself that his work cannot be further improved, before the completion of his monumental "The Birds of Australia."

Correspondence.

COLOUR PIGMENTS.

To the Editors of "The Emu."

SIRS,—I have been approached by Mr. Wilkinson, Commonwealth Government Analyst, on behalf of Mr. Blunt, one of Britain's foremost chemists, asking us to aid him in his research work amongst the colour pigments of the family *Psittacidae* (Parrots) as regards their plumage. Mr. Blunt asks for skins to further his research—ordinary flat skins should suffice. Doubtless many of our Parrots are poisoned, &c. Specimens of flat skins could be sent to the hon. sec. of the Union or myself. I have suggested that the results be sent to you by Mr. Blunt for publication.

ARTHUR MATTINGLEY.

17 Selborne-road, Kew (Vic.), 11/8/14.

Bird Observers' Club.

MR. D. Le Souëf presided at the monthly meeting of the Club held on 17th June at the residence of Dr. H. W. Bryant, "Tarella," Bruce-street, Toorak. The president drew attention to formation of syllabus, and asked members to promise papers. Messrs. Charles Barrett, L. G. Chandler, and F. E. Wilson were re-elected members of the Gould League committee. A paper by Messrs. F. E. Howe and T. H. Tregellas on "Rarer Birds of the Mallee," illustrated by lantern views, was greatly appreciated.

The monthly meeting of the Club was held on 22nd July at the residence of Dr. E. B. Nicholls, "Mooni," Hotham-street, East St. Kilda. Mr. D. Le Souëf occupied the chair. Dr. Nicholls drew attention to a notice in a London newspaper regarding the sale of Emu and wallaby skins. Mr. Le Souëf stated that he had received a letter from Dr. G. Horne, who had given a lecture on Lyre-Birds before the British Ornithologists' Club. Dr. C. Ryan was unanimously elected an honorary member of the Club. Mr. L. Francis gave a lantern lecture, entitled "The District of Shanghai, with Reference to the Birds of China."

The quarterly meeting of the Bird Observers' Club was held on 17th August at the Oldfleet Tea Rooms, Melbourne. Mr. A. J. Campbell presided. Several oversea members of the British Association for the Advancement of Science, including Mr. A. H. Evans, author of the volume on birds in the Cambridge Natural History, and an editor of *The Ibis* for a number of years, were guests of the Club. Lantern slides were shown by Messrs. T. H. Tregellas, C. Barrett, and L. G. Chandler. Mr. Evans, by request, spoke on the subject of nomenclature.

Annual Session.

THE Union's fourteenth annual session will be held in Melbourne in November, with a working excursion to Mallacoota Inlet.

PROGRAMME.

Wednesday, 4th November.—Inter-State delegates arrive.

4 p.m.—Members and friends entertained by Dr. and Mrs. J. A. Leach, at the Tea Kiosk, Botanical Gardens, South Yarra.

8 p.m.—Town Hall, Melbourne. Presidential address, election of office-bearers and members, and official business.

Thursday, 5th November.

10 a.m.—Town Hall. Papers and discussion on Cuckoos, and exhibition of any specimens. Members requested to assist.

2 p.m.—Town Hall. Papers and discussion on Australian mud-nest-building birds.

Friday, 6th November.

10 a.m.—Town Hall. Papers, discussion, and general business

1.15 p.m.—Outing to Black Rock, by train leaving Flinders-street 1.15 p.m. Guests of Dr. and Mrs. E. B. Nicholls.

8 p.m.—Illustrated public lectures in the Athenæum—subjects, "Mallee Scrubs" and "Murray Swamps"—to be given by Dr. J. A. Leach, C.M.B.O.U., &c., and Mr. A. H. E. Mattingley, C.M.Z.S.

Saturday, 7th November.

Meet at 2.30 p.m. at the Zoological Gardens, Parkville, at the invitation of Mr. D. Le Souëf, C.M.Z.S., the Director. Afterwards delegates will be the guests of the President and Mrs. Mattingley at afternoon tea.

Sunday, 8th November.

Excursion to Ringwood, 10.40 a.m. train from Flinders-street station.

Monday, 9th November.—Leave Melbourne for Mallacoota Inlet.

Leader, Mr. A. H. E. Mattingley. Members of the party will travel by rail to Sale, thence by steamer to Cunninghame. The voyage to Mallacoota will be made by special steamer. A landing will probably be made at Gabo Island or Boat Harbour.

The main party will be housed at the hotel at Mallacoota, and working parties can camp out in different directions if desired. It is proposed to spend ten or twelve days in the locality. Early notification of intention to join the "working expedition" is needed, so that proper arrangements may be made. Probable total cost, about £8 10s. Negotiations are being made whereby the cost may be reduced to about £4 per head.

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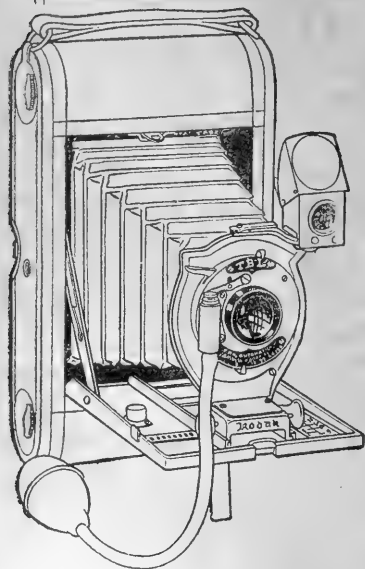
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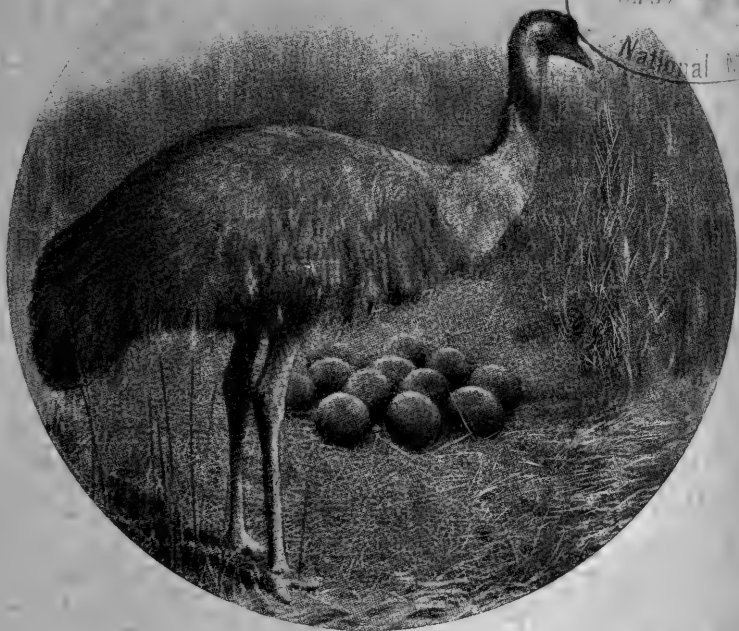
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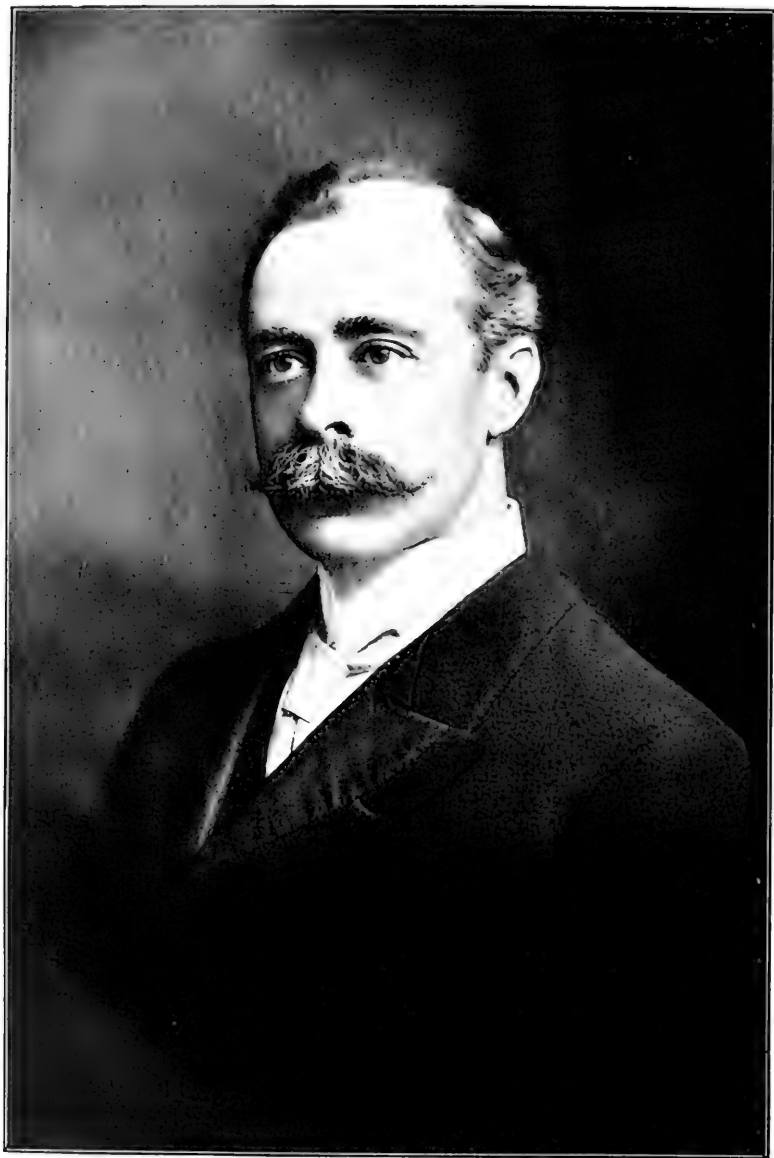
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(The author of each article is responsible for the facts recorded therein, and any deductions he may draw.)

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Mr. A. H. E. Mattingley, C.M.Z.S.
(Eighth President Royal Australasian Ornithologists' Union.)

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The Emu

Official Organ of the Royal Australasian Ornithologists' Union.

"Birds of a feather."

VOL. XIV.]

1ST JANUARY, 1915.

[PART 3.

Royal Australasian Ornithologists' Union.

FOURTEENTH (MELBOURNE) SESSION.

MINUTES OF THE FOURTEENTH ANNUAL SESSION OF THE ROYAL AUSTRALASIAN ORNITHOLOGISTS' UNION, HELD AT MELBOURNE FROM 4TH TO 8TH NOVEMBER, 1914.

FIRST DAY.

ON Wednesday, 4th November, a number of members from South Australia arrived by the express train in Melbourne, and were welcomed at the station by Mr. A. H. E. Mattingley, president, and other Victorians.

Dr. and Mrs. J. A. Leach entertained visiting and local members at the Botanical Gardens in the afternoon. There were present:—Captain and Mrs. S. A. White, Mr. J. W. Mellor, Mr. and Mrs. J. W. Hosking, Mr. and Mrs. Bews, all from Adelaide; Colonel W. V. Legge, from Tasmania; Mrs. C. Barrett, Dr. and Mrs. E. B. Nicholls, Mr. and Mrs. A. C. Stone, Mrs. J. W. Israel, Mr. and Mrs. O. W. Rosenhain, Mr. and Mrs. G. A. Dyer, Mr. and Mrs. C. Cole, Mr. and Mrs. A. H. E. Mattingley, Mr. Anderson, Mr. F. Erasmus Wilson, Mr. D. Le Souëf, and others. A delightful afternoon was spent admiring the beauty of the vistas that are to be seen everywhere in these entrancing gardens, also noticing the abundance of bird-life both on the ponds and in the grounds. Imported birds, such as Thrushes and Blackbirds, were very plentiful, and, of native birds, Honey-eaters were most in evidence. Refreshments were served, and the visiting members from other States were welcomed by the president, Mr. Mattingley, and Dr. Leach. Colonel Legge and Captain White briefly responded.

In the evening the first general meeting of the session was held at the Melbourne Town Hall. Mr. A. H. E. Mattingley, the retiring president, occupied the chair at the opening of the proceedings, and it was subsequently taken by Captain S. A. White, the new president. Among those present were Mr. D. Le Souëf, C.M.Z.S., Col. W. V. Legge, Mr. J. W. Mellor, Dr. E. Brooke Nicholls, Dr. J. A. Leach, Mr. and Mrs. J. W. Hosking,

Mr. Chas. Barrett, and Mr. and Mrs. Bews. Apologies were received from a number of members in other States, who had been unable to come to Melbourne for various reasons.

The Chairman welcomed inter-State visitors.

The hon. secretary's annual report, and the balance-sheet, were adopted. The financial position of the Union was considered very satisfactory, especially in view of the stress caused by drought and the war in Europe. Mr. A. C. Stone, the hon. secretary, and Mr. Z. Gray, hon. treasurer, were congratulated on the excellent work they had done for the Union.

Col. W. V. Legge mentioned the Coloured Figure Fund, and hoped that members would contribute to it liberally. He considered that more coloured plates should be published in *The Emu*. Dr. E. B. Nicholls suggested that each member, when forwarding the annual subscription, might add a small amount for the Fund.

Mr. J. W. Mellor, the chairman, and others discussed colour charts. It was pointed out that a standard chart would be very helpful to ornithologists when describing new forms. The chairman mentioned that a chart had been prepared by an American ornithologist.

The Chairman then read his presidential address, dealing with nomenclature.

Following office-bearers for the ensuing year were elected:—President, Captain S. A. White, M.B.O.U.; vice-presidents, Dr. W. Macgillivray and Dr. J. A. Leach, Col. M. B.O.U.; hon. secretary, Mr. G. Finlay; hon. treasurer, Mr. Z. Gray; hon. librarian, Mr. D. Le Souëf, C.M.Z.S.; hon. editors of *The Emu*, Dr. J. A. Leach and Mr. Charles Barrett; hon. press correspondent, Mr. L. G. Chandler; hon. auditor, Mr. J. Barr. Members of Council:—Victoria, Col. Charles Ryan, Mr. A. H. E. Mattingley, C.M.Z.S., and Mr. A. C. Stone; New South Wales, Mr. A. F. Basset Hull and Dr. J. Burton Cleland; South Australia, Dr. A. M. Morgan; Queensland, Mr. C. A. Barnard; Western Australia, Mr. B. Woodward, F.G.S.; Tasmania, Col. W. V. Legge, Col. M.B.O.U. Local State secretaries—Victoria, Mr. G. Finlay; New South Wales, Mr. A. S. Le Souëf; South Australia, Mr. J. W. Mellor; Queensland, Dr. Hamlyn Harris, F.Z.S.; Western Australia, Mr. A. E. Le Souëf; Tasmania, Mr. F. M. Littler, F.E.S.; Northern Territory, Mr. G. F. Hill, F.E.S.; New Zealand, Mr. W. R. B. Oliver. Printing Committee—Messrs. D. Le Souëf, A. H. E. Mattingley, and A. C. Stone.

Dr. W. T. Hornaday, the distinguished American naturalist, who has done so much in the cause of bird protection, was unanimously elected an honorary member of the Union.

A vote of thanks was accorded the office-bearers of the previous year, special reference being made to the services of Mr. A. C. Stone, hon. secretary, whose resignation was received with great regret. Mr. Stone and others responded.

The following new members were elected:—

Victoria.—John Anderson, Hawksburn; Miss G. M. Cheney, Londrigan; Miss Gladys W. Coleman, Blackburn; Ralph W. Field, Kew; Geo. Finlay, Windsor; C. T. Keam, Wodonga; Dr. J. C. Lewis, Brighton; Jas. E. Lorimer, Canterbury; J. M. Molesworth, St. Kilda; J. T. Morris, Jeetho; A. P. Phillips, St. Kilda; A. E. Rodda, Walhalla; E. Ricardo, Armadale; A. E. V. Richardson, Glenferrie; Maurice Thompson, Brunswick; C. Trescowthick, Abbotsford; C. A. Weber, Melbourne; E. F. Wilson, St. Kilda.

New South Wales.—B. C. J. Bettington, Merriwa; Alex. Borthwick, Sydney; John B. Donkin, Wyalong.

Queensland.—N. Geary, Whitewood; Leslie A. Hall, Morven.

South Australia.—E. Cantwell, Walkerville; Mrs. J. W. Hosking, Norwood.

Tasmania.—Reg. C. Green, Tunnel.

It was decided that the next session should be held in Queensland.

SECOND DAY.

A meeting was held at the Town Hall on Thursday morning, 5th November, Captain S. A. White presiding. Notes on Cuckoos were read, and a discussion followed.

Another meeting was held at the Town Hall, at 2 p.m., to discuss the interesting subject of "Mud-nest Builders." Swallows were left out, but those under discussion were the White-winged Chough (*Corcorax melanorhamphus*), Grey Jumper (*Struthidea cinerea*), and Magpie-Lark (*Grallina picata*). Many interesting facts regarding these birds were brought forward by Colonel Legge, Captain White, Dr. Leach, Mr. Cole, Mr. Le Souëf, and others. The fact that the first-mentioned two species kept in family groups and had their nests in common was noted, and also that they had no sub-species in Australia; but it was very evident that much has still to be learnt about the life-history of these interesting birds, and it is only by patient study that it can be done. The *Grallina* pairs off before nesting, but it was noted that these birds often flocked together when the nesting season was over. They, again, have no sub-species in Australia, but have one in New Guinea.

THIRD DAY.

On Friday, 6th November, at the Town Hall, the business part of the session was concluded. General business was transacted. Captain White exhibited a series of bird skins collected during his recent trip to Central Australia. The specimens were examined with great interest.

In the afternoon delegates were the guests of Dr. and Mrs. E. B. Nicholls at their charming week-end cottage, Black Rock. A ramble over the hills by the sea, where heath (*Epacris*) and other moorland plants grow in profusion, was enjoyed, and many birds were observed. Returning to the cottage, the guests were entertained at tea.

At the Athenæum (upper) hall, in the evening, public lectures were given by Mr. A. H. E. Mattingley and Dr. J. A. Leach, the subjects being "Murray Swamps" and "Mallee Scrubs" respectively. Mr. David Uniapon, an aborigine, related several folk-lore tales of his tribe, and spoke of the past and future of the Australian aborigines. The lectures were illustrated by lantern slides, and were much enjoyed by a large audience. Mr. Uniapon's contribution to the evening's entertainment was also greatly appreciated.

FOURTH DAY.

On Saturday afternoon, 7th November, at 2.30 p.m., a gathering was held at the Zoological Gardens, at the invitation of the Director, Mr. D. Le Souëf, C.M.Z.S. There were 38 present. Not only were the large specimens of animal life inspected, such as giraffe, hippopotamus, elephant, bison, orang-outang, &c., &c., but also many specimens of birds. A young male Lyre-Bird (*Menura superba*) that had been in captivity about eight months was shown; he was still in immature plumage, showing that he does not attain his splendid tail during the first year. The nesting-mound of the Brush-Turkey (*Catheturus lathamii*) was seen, and it was explained that it was heaped together by the male bird only, who took entire charge of the domestic arrangements. All the hen had to do was to make a hole in the mound and lay her eggs there; the male bird then drove her off. Japanese White-necked Cranes were also seen nesting, as well as wild native birds, such as the *Grallina picata* and the Black-and-White Fantail (*Rhipidura motacilloides*). Numbers of wild Nankeen Night-Herons (*Nycticorax caledonicus*) were seen roosting on the larger trees by the waterfowl ponds. These birds always leave at night to obtain food at the various swamps.

After the gardens had been inspected, an adjournment was made to the lawns by the Director's house, and the members were entertained at afternoon tea by Mr. and Mrs. Mattingley. Before leaving, a cordial vote of thanks was passed to Mr. and Mrs. Le Souëf and Mr. and Mrs. Mattingley, on the motion of Captain White. Messrs. Le Souëf and Mattingley suitably responded.

FIFTH DAY.

Under the able leadership of Mr. A. C. Stone, about 20 members and friends had a pleasant ramble through the Ringwood bush on Sunday, 8th November. Mr. Stone had visited the locality previously, and had a number of nests marked down for observation. In addition, a variety of nests in different stages were found by members of the party. Rufous-breasted Whistlers (*Pachycephala rufiventris*) were numerous, and the lovely songs of these birds were heard on all sides, and a number of their nests were examined. Blue Wrens (*Malurus cyaneus*) and Brown Tit-Warblers (*Acanthiza pusilla*) were nesting in the long grass and tea-tree in the valleys, and in the open sapling country Wood-Swallows (*Artamus sordidus*),

White-shafted Fantails (*Rhipidura albiscapa*), and other species were busy nest-building or rearing broods of young. The photographers were at work, and camera shutters clicked busily while the daylight lasted.

An interesting find was a nest of the Scarlet-breasted Robin (*Petroica leggia*) containing two eggs of the Robin and two of the Narrow-billed Bronze-Cuckoo (*Chalcococcyx basalis*). A Blue Wren's nest, which cradled four eggs of the Wren, also held an egg of this Cuckoo. At one place a Nankeen Night-Heron (*Nycticorax caledonicus*) was startled from its afternoon siesta in a bushy sapling, and members had an interesting exhibition of its beautiful flight as it slowly mounted in spiral course to a higher altitude.

THE EXPEDITION.

On Monday, 9th November, a large party left Melbourne for Mallacoota Inlet, where, under the leadership of Mr. A. H. E. Mattingley, much valuable work was accomplished.

ANNUAL REPORT.

Ladies and Gentlemen,—Your Council has much pleasure in presenting to you the Fourteenth Annual Report.

During the preceding twelve months 25 new members have been enrolled, and for various reasons 14 names have been struck off the roll.

A well-attended Council meeting has been held each month, in addition to two special meetings to welcome Dr. H. Harris, State hon. secretary for Queensland, and Mr. Gregory M. Mathews respectively. Mr. Mathews gave the Council an exhaustive explanation of his views on nomenclature.

The resignation of Mr. A. J. Campbell, Col. M. B.O.U., as co-editor of *The Emu* was received with sincere regret, and a motion was unanimously carried by the Council thanking him for his great services to the Union and ornithology in general. Dr. J. A. Leach, who was elected a Colonial Member of the British Ornithologists' Union this year, consented to fill the vacancy.

The Council again has placed on record its indebtedness to Col. Chas. Ryan for his kindness in placing his rooms at 37 Collins-street, Melbourne, at the disposal of the Council for meetings. Colonel Ryan has placed the Council still further in its debt by allowing the use of his rooms during his absence in Europe.

The best thanks of the Council are due to the Zoological and Acclimatization Society of Victoria for their continued kindness in housing the Union's library. Mr. D. Le Souëf, C.M.Z.S., &c., the hon. librarian, has had a series of book cupboards made in which to place the stock copies of *The Emu*, and the Union's thanks are due to him.

During the year a fine series of papers, with accompanying illustrations, have been contributed to *The Emu* by members of the Union, and several new birds and eggs have been described.

In relinquishing my office as your hon. secretary, I have to

RECEIPTS AND

For Year ended

RECEIPTS.					
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„ Adelaide Lecture „	3	9	0	
					10 2 0
					<u>£249 2 7</u>

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At 30th

ASSETS.					
		£	s.	d.	£ s. d.
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Z. GRAY, L.C.A., *Hon. Treasurer.*

MELBOURNE, 1st July, 1914.

tender my best thanks to the members of the Council for the great assistance which they have given to me on every occasion when requested.

A. CHAS. STONE, Hon. Sec. R.A.O.U.

Problems of Nomenclature.

PRESIDENTIAL ADDRESS BY A. H. E. MATTINGLEY, C.M.Z.S.

THE system of zoological nomenclature in its application to Australian birds has been agitating the minds of members of the Royal Australasian Ornithologists' Union since the 1912 annual session at Launceston, when the Check-list Committee presented its report. It has become a vexed question with us. The members were chosen for their experience in the science of ornithology, and it was confidently expected that the Committee would succeed in presenting an acceptable and uniform check-list of Australian birds, satisfying alike to all ornithologists, whether cabinet or field workers.

Although the painstaking and arduous efforts of the Check-list Committee have won the admiration of all for the comprehensive exposition of the whole subject and the exhaustive research on, and critical examination of, our aviforms, yet some disagree with the report. These dissentients aver that the subject-matter of the report, first of all, does not subscribe to the adopted and authorized International Code in respect to the naming of birds with sub-specific differentiation, and, secondly, that there is a lack of strict adherence to the law of priority. These opponents claim that the law of priority is a just law, and that the Check-list is inconsistent, because, while declaring that the use of binomials is the simplest and easiest system of nomenclature for the overworked student, it uses at random a polynomial system for its vernacular names.

The position of President of the Union as captain of the aeroplane, to use a modern simile, renders it incumbent on him to study the physical condition environing his charge, and to direct the course with as much skill and ability as he possesses, so that the machine and its freight may be safely delivered at the end of the journey, and that the machine may be still kept flying by his successor for the benefit of scientific advancement and the addition to the sum total of human knowledge. I will endeavour to chart out the course which, in my opinion, it is best to pursue in regard to the nomenclature of our Australian birds.

For the orderly disposition of knowledge and the demonstration of one of the great corollaries of that theorem evolution, most of us will admit that birds are distinguished from other animals, hence the need of placing them in a separate class. Next, we must inquire how they are related to and distinguished from one

another, and separate those that are like from those that are unlike. This can be done in many ways, as the history of science abundantly proves. Nearly every leader of ornithology has, in his time, introduced his own system. Naturally, a harvest of confusion, due to defective knowledge, has been reaped, and but little golden grain garnered. Remodelling has been rendered necessary. This unhappy state of affairs has arisen principally through the indifference shown to the use as a basis of both the internal and external characters of birds which all thoughtful ornithologists must admit are reciprocal, and therefore of mutual value, and inseparable for purposes of classification; and, also, this state is partly due to the personal idiosyncrasies of thought of each leader.

We have now to construct the family tree or genealogical table which will bring out the true affinities of birds; in other words, to discover their genetic or blood relationships, and establish them with as few breaks as possible after investigating their structural affinities or morphological characters. This needs to be accomplished in as precise a manner as possible, and these characters placed in a scale of values, so to speak, the degree of likeness or want of likeness being based on the theory of evolution, or descent with modification, from a common stem. We now find it expedient to institute a system of grouping, whereby the like are brought together and separated from the unlike. This grouping or grading, whereby we stamp each group with its relative value, enables us to place it correctly in the scale. For convenience, stability, and harmony, biologists have invented an arbitrary naming of these groups, such as class, order, family, genus, and species, which they have further subdivided, hoping that these definitions will prove to be a convenient medium of exchange of ideas with their fellow-workers, realizing that, conventional as these designations are, it is convenient to have a recognized sliding scale of value, whether it be from the highest to the lowest forms or the lowest to the highest. These subdivisions express better that which is most highly specialized by differentiation to the last degree from the characters of its primitive ancestors, if in proper sequence. The goal to be reached is that of finding the right way to arrange, describe, and catalogue birds in a comprehensive and convenient form, recognizing that nomenclature is simply the system of labelling and cataloguing something that has a difference from that of some other thing. For that other thing to be worthy of separate recognition, it should possess constant and stable variation from that of what we term the type.

Previous to the publication of the 10th edition of "*Systema Naturæ*" by Linnæus, the majority of scientists indicated species by a name comprising one word, aided by a lengthy definition. Linnæus, perceiving the cumbersomeness and the inconvenience of this method and the labour involved, introduced the generical system of nomenclatural labelling, thereby systematizing in an

orderly manner the vast array of natural history objects in the animal kingdom surrounding us. For the absolute fixity in and basis for names, the International Congress of Zoological Nomenclature chose the 10th edition of Linnæus. The acceptance of this rule aims at the prevention of any future haggling, and should create a harmonious code, and at the same time should attain a fixity in designation for organized beings.

Having now a very brief outline of the need for an orderly classification of our aviforms, we should examine the machinery we use to produce the directory of the classification of our birds to see whether it works well, needs oiling, or is obsolete. This machinery, based on the binomial system, works on the idea that a species is a fixity. Linné, experiencing the inadequacy of his own binomial system, when naming those groups of lesser value than species, used a third word in conjunction with the binomial name, but separated by the sign "var." (or variety) or some other symbol. Years ago both British and American scientists saw the necessity of recognizing by name a great number of forms of birds intermediate between nominal species, and connecting the latter by links so perfect that the handling of species required reconsideration. The intimate knowledge of the climate and geographical variation of species placed zoologists in a quandary, and they had either to discard a great number of species that had been described, and so ignore all the ultimate modifications of aviforms, or else to recognize as good species the same large number of forms which, it was known, shaded into each so completely that no specific character could be assigned. When speaking of birds a technical name for common use was required. That name was compounded of its genus, species, and variety. It was, therefore, agreed that when two birds were found living together in the same districts they could not be considered sub-species however slight the differential features might be; these must be permanent to make the two birds specifically distinct, otherwise the differences must be put down to individual variation. Where two birds, referable to the same species, but inhabiting different areas, were found to show constant slight separable characters, these were to be ranked as sub-species, even though certain individuals in each area may be inseparable. American ornithologists adopted this system of trinomial nomenclature, and they claim, after casting the system into the melting-pot, to have refined it and made it more valid.

W. P. Pycraft, in "Animal Life: an Evolutionary Natural History," vol. ii.—"A History of Birds," dealing with the subject of variation and natural selection in birds and the origin of species, says:—

"Natural species are said to be physiological species, as distinct from the morphological species of the breeder. This was Huxley's contention. But, as a matter of fact, presumably 'physiological' species often prove, when put to the test, to be syngamic—that is to

say, fertile *inter se*. Nowhere is this more true than among the Galli and Anatidæ, while many Passerines show the same fusibility—e.g., the Carrion and Hooded Crows. The more closely, in short, any given 'species' is studied the more does this supposed infertility between it and its near allies break down. We are beginning to realize that, as Sir Ray Lankester long ago contended, the old conception of species must go, and with it must go the word 'species' itself. In its place he would substitute the word 'forms.' Modern zoology furnishes abundant evidence in favour of this view. For any given 'species,' if carefully studied, will be found to be divisible into a number of geographical 'races,' often differing one from another only in intensity of colour. The numbers of these races or sub-species, as they are called, are being constantly multiplied as closer scrutiny is brought to bear upon them, and as a consequence the term 'species' is in proportion losing its significance. Yet the existence of asyngamic forms—forms which, while obviously related, are yet infertile when crossed—as well as of forms with no very near allies, cannot be controverted. These are to be regarded as so many isolated geographical races whose annectent members have perished, and they might well be distinguished by some special term were it not for the fact that it is at present, and is always likely to be, impossible in the vast majority of cases to discover which are and which are not asyngamic. Undoubtedly it would be a good thing to abandon the word 'species,' substituting therefor some term capable of embracing within its meaning what are now called 'good species' and all variants thereof. But such a word would really connote generic rather than specific value, as these terms are now understood, and there is little likelihood of such a drastic step being taken by the present generation of biologists."

We classify because the members of the whole animal kingdom, from the highest to the lowest, are marvellously connected in their structure. A classification, therefore, is simply a statement of gradations of likeness which are observable in animal structures, wherein the class Aves is incorporated. But we are not concerned so much with the classification of birds at present as with the admission of certain forms to sub-specific rank, indicated by a trinomial system of labelling. In this respect I venture to say that no scheme either of classification or of nomenclature will be entirely satisfactory to all until we symbolize our bird names. The advantages derived by chemists when they symbolized chemical combinations were great. Some time ago I pointed out the necessity of naturalists adopting a definite and uniform method of describing the colouration of natural history objects, and advocated the use of a colour chart.* This has at last been accomplished, and an excellent chart has recently been published. Fortified by this, I now venture, without egotism, to urge the necessity of symbolizing in some form the method whereby the relationships of animals one with the other are indicated and chronicled. This will fix their sequence in relative rank, from the lowest forms to the highest, or *vice versâ*, in a concise manner. Were we to use a chart depicting the avine family or phylogenetic tree of ascent on the main lines of

* *Emu*, vol. ix., part 1, p. 48.

evolution, and classified and agreed to internationally as a basis, and for a fixed period, we should have a stable foundation from which the student could proceed. Otherwise, we might arrange the family tree in some form of arithmetical progression, genera, species, and sub-species to be expressed fractionally. The present method of naming birds is arbitrary, and is governed by the personal idiosyncrasies of the classifier, subject to certain established rules in common use. This method, at best, panders to the vanity of workers, and therefore is likely, in the future as in the past, to introduce into scientific research most undesirable features. Each classifier in turn has endeavoured to frame an infallible rule to determine what shall be a species, sub-species, or variety. The granting of specific and sub-specific rank simply indicates an appreciation of the value of the zoological specimen before us.

The whole zoological system within which our aviforms are incorporated is still in a transitory state. Its early fixity is both desirable and necessary. We should endeavour to aid its fixity in every way. The system is becoming extremely weighty. The lightening of the burden by the symbolization of the nomenclature or by a synthetical system of arithmetical progression of degrees of value should help to relieve the tension. We should modernize our machinery, and scrap-heap the old, though cherished, mechanism that has been good enough for past service. The sum total of zoological knowledge is being yearly added to, and is growing too voluminous for the old foundation to carry safely the superstructure. Until the consummation of the project that I have promulgated we should provisionally accept the system that indicates best the intergradation of animals. For your information let me here cite Article 2 of the International Rules of Zoological Nomenclature, framed to meet nomenclatural refinements:—"The scientific designation of animals is uninominal for sub-genera and all higher groups, binomial for species, and trinomial for sub-species." I maintain that the system, to be of use, must be universal. Pursuant to the laws of the International Code, the name chosen will have the best chance of permanency, seeing that its code governs all zoology. Science recognizes no nationality or boundary. If we desire to be scientific we must perforce bow to science, and conform to its established usages, which are framed, if we can use such a term, for utility.

We cannot place sub-species on an equal footing with species. Neither can we deny them rank if we admit species to a status apart from genera. It is, therefore, necessary to have some system of nomenclature. The trinomial or trinominal system appeals to me as the best method at present in vogue. Neither the binomial nor the trinomial system prevents "hair-splitting" by the devotees of either method. Trinomialism indicates at once that a bird is but a geographical variation of a typical form, and shows at a glance its value and status. This prevents the needless searching out of an original description, such as is often

necessary with binomialism. Relationships are thus more easily expressed by a trinomial designation, and well-defined species are not inconveniently combined with local races. Under the trinomial system let us remember that the individual variation of birds of the same species living in the same district does not entitle them to sub-specific rank unless the differential features are constant. We should also bear in mind that birds of the same species inhabiting different areas, exhibiting slight but permanent variable characteristics, rank sub-specifically, and are to be deemed as a representative race. To my mind, the use of the geographical name for sub-species indicates the locality from whence the animal comes, and should, therefore, be universally used for the third word when naming. By subscribing to the International Code of Nomenclature (with some slight modifications as adopted by the British Ornithologists' Union) we will hand down to posterity a unified code of nomenclature, a recognized and universal basis for the future study of the world's aviforms from prehistoric times onward, thus building the house of ornithological knowledge brick by brick. In urging this I am fortified by the following letter received by me from Mr. W. R. Ogilvie Grant, of the British Museum (Natural History), London :—

"The committee of the British Ornithologists' Union hope to issue this autumn a new and revised edition of 'A List of British Birds.' You will then be able to see what course has been adopted in the matter of nomenclature.

"Article ii. of the rules is adhered to, with some slight modifications. The rules followed by the committee of the B.O.U. are as follows :—

"That the 10th edition of Linnæus' 'Systema Naturæ' be taken as the basis of priority except—(i.) when it entails the transference of well-known names, either generic or specific, from one species to another, such as *Turdus musicus* to the Redwing, *Chelidon* to the Swallow, &c. ; (ii.) when it entails the alteration of a name that has been in common use for many years, the changing of which will lead to confusion, such as *Ruticilla obscurus gibraltariensis* for *R. tithys* and *Gavia stellata* for *Colymbus septentrionales*.

"That in cases where a specific name has been subsequently made into a generic name, such specific name must not be replaced, but must still stand—e.g., *Perdix perdix* for *Perdix cinerea*.

"That under the binomial headings of the species be added in trinomials the names of the races recognized by the committee as occurring in Britain. For the typical race only binomials are used—e.g., *Coccothraustes coccothraustes*, not *C. c. coccothraustes*.

"That the secretary be directed to keep a list of the *nomina conservanda*, to be printed separately at the end of the general list of British birds."

Although the Check-list, based on Gould's classification and binomialism, presented by a committee of the Royal Australasian Ornithologists' Union, is good enough for the present needs of Australian students of ornithology, and will remain, to the more conservative, their text-book for perhaps ten years—a running of the old machinery, so to speak, until the more modern is installed

—still sacrifices have to be made for posterity, and, out of deference to the curriculum of the school of younger ornithologists, the sooner the International Code is adopted and used the simpler, and therefore easier, will it be for future students to follow the science of ornithology in its application to Australian birds. It will be a benefit alike to Australian and foreign students. To overcome the difficulty and bring the binomialists and trinomialists of Australia into line, and for the better advancement of ornithological science in the Commonwealth, I would urge that, in future, no better compliment could be paid by one ornithologist to another than to quote the binomial name as well as the trinomial name where possible for sub-species, slender as the differences often are, until the time when, through the greater knowledge acquired by the future study of the life-history of our birds, the framing of a new Check-list to supersede the present one will be imperative.

In conclusion, permit me to point out that we must take advantage of every factor which helps in scientific development, and, ignoring no person who has a contribution, however small, to offer, we must go on to better things, with the consciousness that only the end of time will see perfection. For we shall assuredly outgrow any system that may be inaugurated, because we are constantly moving on towards the ideal. And may we ever remember that our ideal of perfection in nomenclature will be improved upon by the rising generation, for which we should be indeed grateful. With all humbleness, and with gratitude in our hearts for the benefits bestowed on us by scientists of the past for the gift of the present nomenclatural system, let us return to them our sincere thanks.

The Mallacoota Excursion.

BY A. H. CHISHOLM, R.A.O.U.

"A LOVELY and a lonely place; neither Port Jackson nor Broken Bay are fit to hang on the line with it in memory's gallery." This was the testimony given Mallacoota Inlet less than a decade ago by the late Francis Myers, picturesque writer and nature-lover. A striking recommendation, truly; and, to those bearing it in mind, the decision of the Council of the Union to hold the 1914 excursion at Mallacoota could not fail to arouse pleasurable anticipations. There were, however, a variety of factors militating against a record attendance of members when the time came, and the result was that the excursioning party was not quite so comprehensive as is usually the case. At the last moment Dr. C. S. Sutton, of Melbourne, was prevented from making the trip; and, as neither Dr. J. B. Cleland, of New South Wales, or Mr. F. M. Angel, of South Australia—two "regulars"—could get



An Arm, Mallacoota Inlet.

FROM A PHOTO. BY J. T. HAMILTON.



The Entrance, Mallacoota Inlet.

FROM A PHOTO. BY J. T. HAMILTON.

along, the ornithologists had regretfully to leave without the inclusion of either a leading botanist or entomologist. Numbers, however, were not lacking.

The party taking part in the annual camp-out was a large one. It was also strong officially, for it contained the president, Capt. S. A. White; two ex-presidents, Messrs. A. H. E. Mattingley and J. W. Mellor; and a vice-president, Dr. J. A. Leach. The following also attended:—Mrs. White, Mrs. J. W. Israel, Miss Thom, Mr. and Mrs. J. W. Hosking, Mr. and Mrs. Bews, Mr. and Mrs. G. A. Dyer, Master and Miss Dyer, Miss Ure, and Messrs. O. W. Rosenhain, Ladwig, Cutler, J. T. Hamilton, Molesworth, Phillips, A. H. Chisholm, Watson, Hill, and Elster. Mr. Mattingley proved a good leader; he spared no trouble, and secured complete success. The accommodation was good, and all were satisfied. The only regret was that time had passed so quickly that work had to be left unfinished.

Leaving Melbourne about 8 o'clock on the morning of 9th November, the party trained pleasantly through green-veiled areas that came as a sharp relief to eyes long dazzled by the dust-glare of this extraordinarily dry season. Bairnsdale was the railway terminus, and by 5.30 passengers and baggage were aboard the s.s. *Wyrallah*, and were steaming down the broad face of the Mitchell. Some small diversion was created by the discovery of the fact that an intending passenger had mislaid himself and was aboard a fishing smack. He was picked up before Lake King was reached. The most attractive scene vouchsafed that evening was the vivid, vital sunset over the Mitchell; the lake views could not be grasped in the darkness. The passage round the coast to Mallacoota was fair, though the tossing of the little steamer disturbed the equilibrium of most of the party, and passengers were taken off by motor launch, reaching Lake View Hotel, Mallacoota (Miss E. Dorron, proprietress) about midday on Tuesday, 10th November.

To many of the visitors the first impression of the locality—after a deep breath of admiration had been drawn at the picturesque inlet—was one of surprise at the amount of settlement scattered about the far-reaching shore-line. Dorron's hotel—an old-established institution—has the eastern fringe practically to itself, but across at Mallacoota West a little colony is springing up. The impression—or expected impression—of loneliness was further dispelled by the sight of English Starlings (*Sturnus vulgaris*) flocking about the homestead paddocks. Is there any locality in southern Australia to which this cosmopolitan vagabond has not penetrated?

After lunch there was time and inclination to view properly the shining sheet of water stretching away from the foot of the settled rise. And it was good to see. One could not borrow Her Majesty of Sheba's exclamation, "The half was never told me"; but of a surety Mallacoota could not be regarded as aught but "a lovely place." Running inland from a sand-bar just west

of Gabo, the Inlet stretches away to the long estuary of the Genoa River, while in a northerly direction it reaches away in numerous fantastical indentations to receive the tribute of small mountain streams. It is this marvellously-indented shore-line that makes Mallacoota what it is. The long sand-ribbons scattered throughout the Inlet add to its attractiveness, though a nuisance to navigation: but nothing quite equals those fanciful little coves that play hide and seek with the incoming tide. Clipped in with sombre, heavily-timbered hills, whereon bracken fern runs down to the shore-line, the Mallacoota water provides "wide wandering for the greediest eye."

We obtained an idea that first afternoon of the class of birds adjacent to the homestead. There was nothing out of the ordinary. The omnipresent Blue Wren (*Malurus cyaneus*) was much in evidence. Scarlet-breasted Robins (*Petroica leggiai*) flitted silently among the tea-tree scrub. The White-shafted Fantail (*Rhipidura albiscapa*) was well represented in the orchard; the Fan-tailed Cuckoo (*Cacomantis flabelliformis*) trilled frequently; the Coach-whip (*Psophodes crepitans*) cracked in a damp gully close by; while the pretty *Lalage* (*Campephaga*) *humeralis* and several other well-known species were nesting not far from the house. But it was the Inlet itself that provided the most striking bird picture, the thousands of Black Swans (*Chenopsis atrata*) that apparently spend the summer on the peaceful waters and sands being a sight of ever-recurring interest. They tacked about in squadrons suggestive of old Spanish galleons, and, whenever disturbed—they were very wary—would start off in their hundreds across the water with a splendid show of black and white, and a noisy patter resembling the hand-clapping of a particularly enthusiastic football crowd.

There was only time that afternoon for a ramble of a few miles about the thickly-timbered and heavily-brackened country east of the homestead. It was not a particularly interesting walk, for the scenery was prosaic and the birds few in numbers. Both the Rufous and Golden-breasted Whistlers (*Pachycephala rufiventris* and *P. gutturalis*) were well represented, however, and they did their best to cheer the way. Later we found that the handsome *P. gutturalis* was remarkably plentiful in all parts of the adjacent localities.

Braving a misty rain on the Wednesday morning, most of the party went by motor launch to the big sand-bank of the Inlet, and there found eggs of the Pied Oyster-catcher (*Hæmatopus longirostris*) and Red-capped Dottrel. A lunch-hour ramble about the vicinity of little Refuge Cove, adjacent to the mouth of the Genoa, revealed little bird life; and the same was the case on various islets—magnified sand-banks, lightly timbered, and carrying a good deal of *Mesembryanthemum*. The most interesting birds taken that day by other workers were the Flame-breasted Robin (*Petroica phænicea*) and Gang-Gang Cockatoo (*Callocephalon galeatum*). Later we found Flame-breasts rather

numerous about the grassy places east of the rendezvous. No nests, however, were located.

Sleeping in houses has advantages, but the practice on such a trip also carries disadvantages, chief of which was the missing of the dawn-chorus that campers-out become accustomed to hear from the birds. And so early rising was not a feature of the trip. The whole place, in fact, was a land of "Lots of Time," and soon the visitors philosophically adapted themselves to the novelty of having to wait till after 8 p.m. for a dinner announced for 7. They said, in effect, "What boots it to repeat that time is slipping underneath our feet?" And time slid away the faster because of the supreme disregard meted out to it. The factor most clearly defining the passage of the days was, by the way, the receipt of war news, which, seemingly, was impossible to leave behind. It came over the wires each evening.

The party split on the third day, and each detachment got on well. A walk to Lake Barracouta, a fresh-water sheet about 3 miles from Mallacoota, did not reveal the expected water-birds, but the beautiful heath country passed through gave the retiring little Emu-Wren (*Stipiturus malachurus*), a *Calamanthus*, and a Bristle-Bird (*Sphenura brachyptera*), while a *Climacteris* that Mr. Mellor secured occasioned a good deal of speculation because of the bright rufous marking of the lower back and rump. This bird was generally regarded as specifically new until Captain White proved it to be the young of *Climacteris leucophæa*. That portion of the party that went westward by motor launch occupied a goodly time on the water, travelling through the wonderfully-indented Genoa "lake" and along the majestic river to where it joins forces with the equally broad-bosomed Walangaraugh. Fine streams are both of these, and the run to Gipsy Point (near the meeting of the two rivers) is as delightful a boating excursion as the most fastidious could desire. Some of the numerous little coves are absolute gems, and the "sou'-west arm" of the lake (or river), with curiously-pointed Genoa Peak smiling down out of a blue mist, is a single pearl. The country inland from the bank opposite the Gipsy Point postal depot appeared inviting, but the birds were hardly more numerous there than the snakes—big, active black fellows that persuaded one to keep an attentive eye on the ground as well as up trees. Everywhere was the incessant greenness of a luxuriant land, from the tall, straight timber to the bracken and thick scrub; and it was probably just this that accounted for the absence of numbers of birds. Creatures of light do not seek heavy over-grown areas in any numbers.

Friday morning found the motor launch in service again, and a call was made at the residence of Mr. E. H. Lees, surveyor, a well-appointed, prettily-situated dwelling on a north-eastern arm of the inlet. After enjoying hospitality there, the party moved north, and, while most stayed quietly about the shore, the ornithologists rowed up the pretty, narrow, much-snagged stream

known locally as the Dowell River. Only a few miles could be negotiated with the dingey, and the thick jungle country had to be reached on foot. The end of the brackish water was soon made apparent by the silvery tinkle of the communistic Bell-Miners (*Manorhina melanophrys*). They were about the thickly-grown waterway and fern gullies in plenty, and numbers of Satin Bower-Birds (*Ptilonorhynchus holosericeus*) and one or two strong-voiced Coachwhips kept them company. Lyre-Birds were probably plentiful enough there, too, for their scratchings could be freely noted.

Though the Saturday morning was dull and close, with rain threatening, a launch excursion was made to Captain's Point, near the Inlet entrance (from whence a glorious panoramic view could be obtained), and a party walked from thence round the coast—incidentally inspecting a very old ruined slab residence, a relic of the fifties—towards the Betka River. It was half expected that *Pezoporus formosus* would be met with in the heath country above the beach, but the only fresh birds noted there were odd Glyciphilas, while in the big timber inland one of the rare, pretty Black-faced Flycatchers (*Monarcha carinata*) and a family of Banksian Cockatoos (*Calyptorhynchus banksi*) came under notice. A soft, humid rain made matters rather damp in the afternoon, but it had little apparent effect on the thousands of flies accommodating themselves on each person. These insects are not so pertinacious and persistent as our ordinary fly, and 'twas just as well, for their numbers were astonishing.

Though the Sunday dawned clear, it was not long ere a blow sprang up, and, accordingly, motor launch excursions were declared off, the chief boatman having a decided aversion to taking risks of any kind. Advantage was taken of the quiet day by a couple of party members to row across to Mallacoota West, where Mr. E. J. Brady, the well-known, much-travelled poet and descriptive writer is carving himself a home out of the bush. He and Mrs. Brady were warmly hospitable, and so, too, were their pretty little bird-loving children.

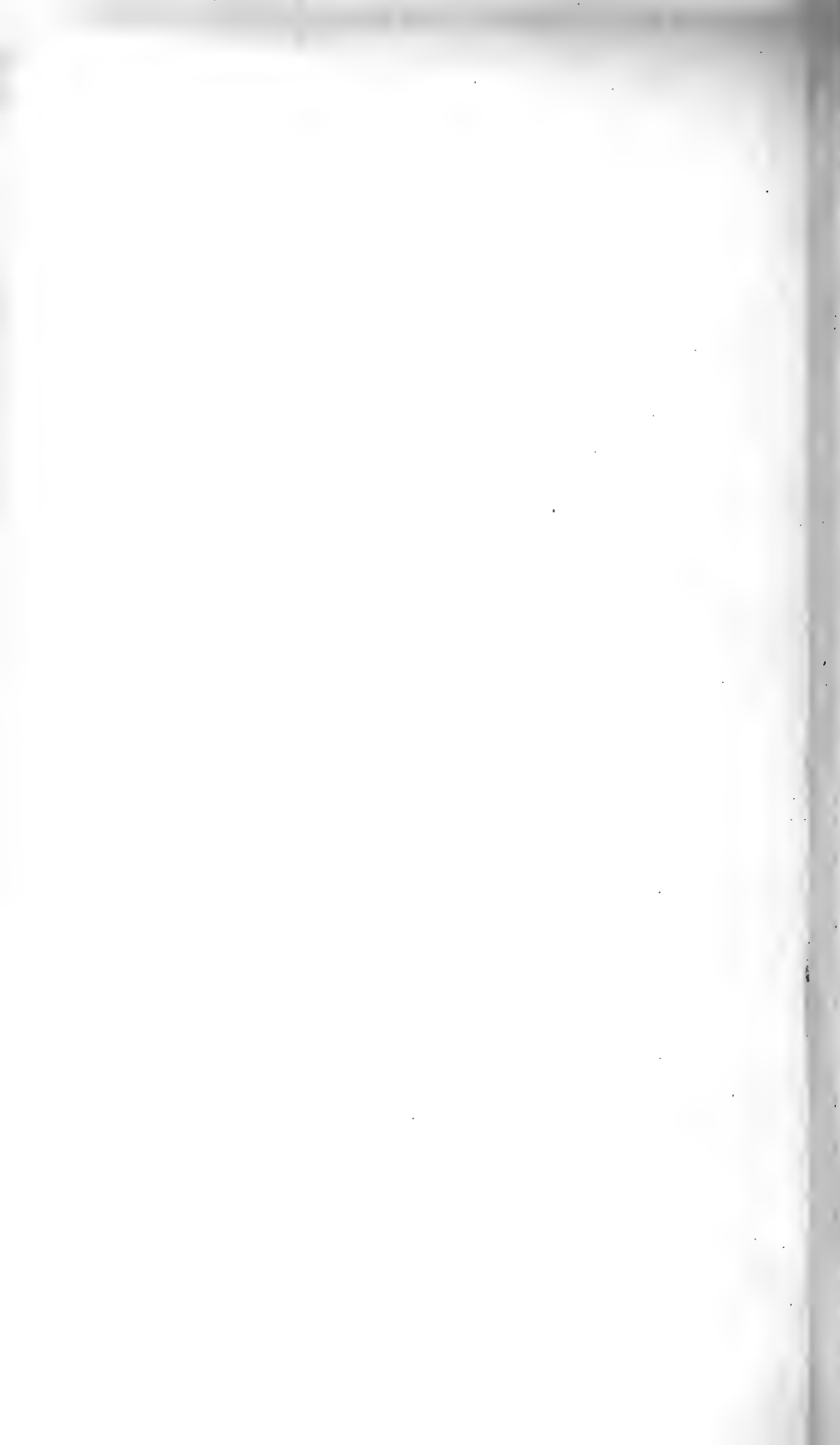
The Betka River country not having been thoroughly worked on the first visit, the week was "officially" opened (on the Monday) with another launch visit to the vicinity of the entrance. The day was exceedingly hot, and the gloriously green, park-like country in from "Tea-tree Corner" (just west of Captain's Point) was too cool and altogether inviting to permit of long rambles. No fresh birds were noted, though some very interesting marine life came under notice along the adjacent coast-line.

On Wednesday, 17th November, while one party was journeying overland, a second party, consisting of Dr. Leach, Messrs. Mattingley, Hamilton, and Elster, with Mr. Tom Dorron as guide, set out on horseback on a two days' trip to the east. Howe Hill, the culminating peak of a north and south range, was ascended, and Cape Howe and Conference Point were visited. New South Wales was entered, the Naggi Lake was passed, and



The Home of Satin Bower-Bird and Lyre-Bird, Dowell River, Mallacoota Inlet.

FROM A PHOTO. BY A. H. CHISHOLM.



the night was spent at the Naggi River. Well-grassed flats, lightly-timbered plains, drifting sand-hills, dense tea-tree scrubs, and open heaths were the chief features of the outward journey. On the homeward journey the Ground Parrot was met in two places when crossing open heathy moors. The high wind rendered it difficult to flush birds from the good cover. Interesting open forest was traversed, and birds previously met with were common. Wau Wauka Lakes were admired, and an extremely rough ride was experienced when skirting the lower lake. After crossing the granite ridge which ends at Howe Hill and Gabo Island, it was decided to keep inland along the north of Barracouta Lake. All appreciated the change. Beautiful valleys were occupied by pellucid streams and clothed with dense semi-tropical jungle. "Supple-jacks"—creeping lianas, some of great size, climbed over the tall trees. Tree-ferns were conspicuous, while kanukas, blackwoods, pittosporums, and lillie-pillies (*Eugenia*) were common. Here Lyre-Birds were numerous, though difficult to see. Satin Bower-Birds were also to be seen, and many gullies had a company of the vivacious green Bell-Miners. King Parrots in scarlet and green claimed attention, and Laughing Kingfishers (*Dacelo gigas*) raised the spirits of tired riders. The Yellow-eared Honey-eater (*Ptilotis chrysotis*) lives in these dense, damp jungles. The Black-faced Flycatcher (*Monarcha carinata*) was also found in such situations. The timber resources of this district of high rainfall are great, and much wealth awaits enterprise and energy. After a most interesting ride, the hotel was reached about sunset, just before the threatened rain.

Meanwhile, a party of four had walked to the aboriginal kitchen middens on the sand-dunes along the ocean beach. On the return journey the party visited the haunts of the Emu-Wren, *Calamanthus*, *Glyciphila*, and Bristle-Bird, on the heath country, and admired the acres of flowering plants. In the dull light a dispute arose as to which was really the north end of a borrowed compass. Darkness coming on, the wanderers decided to camp, as they had entered a thick jungle. After a late dinner, tired ornithologists set out to search for the lost ones. Early morning rescuers found the party on the way home. No one was any the worse for the wet and hungry night out.

Each day found small parties at work. Some followed up the heath birds; others worked the jungles; others, again, were fishing; while several early morning visits were made to the Goodwin Sands, where wading birds, Terns, and Gulls abounded. Ternlets nesting at highest tide level proved to be the White-shafted species (*Sternula placens*)—a new record for Victoria. This species evidently replaces the White-faced Ternlet (*Sternula nereis*), which occupies similar sand-spits and islands further west on the Victorian coast. Red-capped Dottrels also nested on these sands—an area about three miles in circumference, all covered at high tide except about one acre. One Red-capped Dottrel's nest, containing two eggs, was in a clump of grass and vegetation

about a foot in height. A Pied Oyster-catcher's nest contained three eggs.

On Saturday a second visit was paid to the jungle on the Dowell River, and on Sunday a whole-day trip enabled the party to reach the New South Wales border on the Wallagaraugh River, the easterly branch that meets the Genoa River above Gipsy Point. The day was hot, the party large, and the motor boat was slow. Much likely country, clothed with fine timber, was seen, but its exploration had to be deferred. Mr. Dorron, our guide, reported that Pittas were fairly common for part of the year in this country. This is interesting, for that bird has not been recorded from Victoria. Our thanks are due to Mr. Baker, head teacher of the Malla-coota School, for conveying the parties in his launch on these trips.

It was noteworthy that no member of the group of Rail-like birds (Ralliformes) was seen by any member of the party. The locality is ideal for such birds, and we were assured they were very common for most of the year. They leave the Inlet to breed in fresh-water swamps. We did not discover any breeding-places, but doubtless further search will reveal many. The Swans, so numerous on the Inlet, do not breed there. We saw a few broods of small cygnets following the parent birds. Many of the Swans were moulting, and could not fly.

Monday was devoted to concluding investigations, securing photographs, and packing up for the homeward journey. During the afternoon a party with the heavy luggage had an exciting time in a falling tide on the bar, but caused less worry to those at home, for the leader was able, after a time, to land and telephone that we were delayed until the tide rose. This occasion will be long remembered by all the party. The pluck, resource, and skill of Mr. Tom Hall, a Mallacoota fisherman, saved a probable disaster. Mr. George Phillips, a yachtsman, of our party, rendered valuable assistance, while Mr. Cutler placed all under a debt of gratitude by his strenuous and successful efforts to repair the disabled engine before the tide turned.

On 23rd November, Boat Harbour was reached in time. A good sea was running, and the *Wyrallah* waiting. The crew assisted passengers on board the boats, and an unpleasant climb on the swinging rope ladder brought us to the last stage of a trip full of interest and incident. Albatrosses gave a fine exhibition of flying. Skuas in many phases of plumage, Short-tailed Petrels (Mutton-Birds), Giant Petrels, Silver Gulls, and Gannets were about the ship in considerable numbers. An easterly breeze assisted us along the Victorian coast, and in 10 hours we were off the Lakes' Entrance, only to find that the tide was unfavourable, and that we must lie off until midnight.

On Wednesday the Lakes steamer *Dargo* was boarded, and the beauties of 70 miles of lake and river were enjoyed. Taking train at Sale, Melbourne was reached in due course. Thus ended one of the most successful of the fourteen annual ornithological expeditions of the R.A.O.U.

From Gipsy Point the overland party—Mrs. Israel (who journeyed only to the Cann River), Messrs. Ladwig, Rosenhain, Molesworth, and Chisholm—went six miles or so by motor launch along the attractive wattle-rimmed back-waters of the Genoa, and then rattled over four miles in a buckboard to the accommodation house at Genoa “township.” A good many common birds frequent the open spaces thereabouts, but the tall, dark hills are mostly silent. The most surprising find was a pair of the imported Goldfinches (*Carduelis carduelis*) flitting about near Flame-breasted Robins and Brown Flycatchers (*Micreeca fascinans*). Fox and rabbit, Starling and Sparrow, have long been about East Gippsland, but one would hardly have expected to find the Goldfinch so far back. The day-dawn sounds (at 3 o’clock) on Wednesday were the voice of Mrs. Israel and the trill of the Fan-tailed Cuckoo, and by 5 o’clock the quintette was coaching along in the direction of Orbost. Many less pleasant occupations might be pursued than speeding along Gippsland roads on such a fresh spring morning, especially in view of the excellent state of that particular road, and the fact that the numerous small rivers along the way provided fine companies of ringing, rippling Bell-Miners. They were altogether beautiful, these bush streams; with their shallow courses and wealth of flowering vegetation. The Wingan—we heard Regent Honey-eaters (*Meliphaga phrygia*) fluting there—Thurra, Cann, and Bemm Rivers, as well as such less-dignified streams as the Euchre, Bell-Bird, and Tonghi Creeks, suggested waterways of Fairyland, and were only equalled in attractiveness by the beautiful scenery of Mount Drummer, over the brow of which the road meanders a few miles on the Genoa side of the Cann River settlement.

The night-halt was made at the Bell-Bird Hotel, prettily situated on the bank of the creek of that name. There Bell-Magpies (*Strepera graculina*) were found to be plentiful and tame. Satin Bower-Birds were numerous in the white-flowering Christmas-bush (*Prostanthera*). We saw one raucous-voiced female being relentlessly and cleverly harried by a pair of White-shafted Fantails. Gang-Gang Cockatoos, King Parrots (*Aprosmictus scapulatus*), and the equally gorgeous Crimson Parrots (*Ptilinopus pennanti*) were in the adjacent big timber in good numbers, while the ringing voices of Lyre-Birds (*Menura victoriae*) and Coachwhips floated up from the dense fern gullies with the first hint of dawn. The birds after which the creek is named were not to be heard close by; they have gone further back. Opportunity was afforded the visitors there of hearing a fine Coachwhip duet, the male emitting the drawl and crack, and the female the smart double-note follow-on; and, again, the male managing the whole of this pretty performance.

From the Bell-Bird Creek to Orbost the roads were not so good, and the country rather less interesting. Some nice patches of wild-flowers presented themselves, but there was little of the magnificent timber of further east, and no fresh birds. Gay Parrots

still flashed along the fringes of the clearings, and an odd *Cinclosoma* sat quietly on a log as the coach rattled by; but the only additional bird listed was the light-loving White-browed Wood-Swallow (*Artamus superciliosus*), which skimmed about the paddocks near Orbost. This trim little town was reached at mid-day on Thursday, and, as though a 90-mile coach ride had not been enough, the quartette secured a buggy that afternoon and drove 10 miles to Marlo. The best of the rich Snowy River flats are passed on this trip to the coast, and it did one good to note their luxuriance. Next to the enterprising Starlings, which are there in thousands, the most plentiful birds along the river frontage are the Bell-Miners. A young one, fully grown, was caught for the cameras, and it was curious to note how the customary musical note of the parents changed to a harsh Miner-like protest as they grew excited. The juvenile had remarkably strong, sharp claws.

Orbost was left early next morning, and from thence to Nowa Nowa—26 miles—excursionists did little but hang tight as the coach rattled over the absolutely vile road, and admire the skill of the driver in dodging ruts and trees. Warm interest was, however, aroused by the splendid patches of scarlet bottle-brush that were occasionally passed, and by the attractiveness of Hospital, Wombat, and other creeks. At the little Nowa Nowa settlement there was just time for the securing of a few photographs of the rock-bound Boggy Creek—a curiously inappropriate name—before climbing aboard a motor-car and doing the rough 35-mile stretch to Bairnsdale in a couple of exhilarating hours. The afternoon train was caught with a few minutes to spare, and Melbourne regained some time after 10 o'clock on the Friday evening.

A hurried examination of the material obtained at Mallacoota has proved interesting. It reveals some unexpected relationships to the birds of Kangaroo Island. Further study is desirable, for the similarity of fauna of south-east and south-west Australia has led to many theories of past geographical changes. A. R. Wallace considered Australia to consist of two islands, though that is not held now. Professor Gregory, on geographical grounds, compared Australia to a trident, with three prongs projecting northwards; most of the base of the trident has disappeared. The Antarctic connection referred to in the introduction of his 1913 list by Mr. Mathews, and questioned by the reviewer in *The Ibis*, is almost an axiom with Australian zoologists. A close study of the avifauna will assist materially in providing evidence for a definite conclusion on these points.

THE Société d'Acclimatation de France had a special medal struck, and presented it to Dr. W. T. Hornaday, Director of the New York Zoological Park, in recognition of the wonderful work he has done in connection with the protection of birds in the United States. No man, in America or any other country, has done more than Dr. Hornaday to save vanishing wild life.

The Birds of Mallecoota.

By CAPT. S. A. WHITE, M.B.O.U.

THIS list comprises the birds identified during the working excursion to Mallecoota Inlet and the surrounding district:—

Dromaius novæ-hollandiæ (*Dromiceius novæhollandiæ novæhollandiæ*)*. Emu.—Although these birds were not actually seen, their tracks were met with in many places.

Eudyptula minor (*E. minor undina*). Little Penguin.—These birds were seen in the water off the Inlet.

Coturnix pectoralis (*C. pectoralis pectoralis*). Stubble Quail.—Met with in the more open country near the coast

Synoicus australis (*S. ypsilophorus australis*). Eastern Brown Quail.—Seen in open timbered country.

Turnix varia (*Ortygodes varius varius*). Eastern Painted Quail.—Flushed in the low bush country.

Phaps chalcoptera (*P. chalcoptera chalcoptera*). Bronze-winged Pigeon (?).

Phaps elegans (*Cosmopelia elegans neglecta*). Brush Bronze-wing Pigeon.—Fairly numerous, and were flushed in pairs through the big timber country. The stomachs contained large seeds of a shrub, as well as grass seeds.

Leucosarcia plecta (*L. melanoleuca*). Wonga-Wonga Pigeon.—Numbers of these fine birds were heard calling in the heavily-timbered valleys, and were flushed from the ground on several occasions.

Puffinus brevicaudus (*Neonectris tenuirostris brevicaudus*). Short-tailed Petrel.—A number of these birds were seen flying over the ocean near the mouth of the Inlet.

Ossifraga gigantea (*Macronectes giganteus giganteus*). New Zealand Giant Petrel.—A bird was reported as having been seen just after leaving the Inlet on our return journey.

Diomedea exulans (*D. exulans rothschildi*). Australian Wandering Albatross.—These fine birds followed our vessel along the coast-line. Adults and dark-plumaged young were admired in their fine flights about the vessel.

Diomedea chlororhynchus (*Nealbatrus chlororhynchus bassi*). Yellow-nosed Mollymawk.—One or two of these birds flew round our vessel, and at the sight of refuse thrown overboard would alight upon the water and pick up the food.

Diomedea cauta (*Diomedella cauta*). White-capped Albatross.—Numbers followed us on our journey down to the Inlet and on our return.

Sylochelidon caspia (*Hydroprogne tschegrava strenua*). Australian Caspian Tern.—It was reported that a bird was seen flying over the waters of the Inlet.

Sternula placens (*S. albifrons placens*). Eastern White-shafted Ternlet.—Numbers of these graceful birds were nesting on a low sand-

* The names in brackets are according to "A List of the Birds of Australia," 1913, by G. M. Mathews.

spit (Goodwin Sands). The slight depression in the sand contained from a single egg to the full clutch of three. It is almost impossible to separate this bird from *S. nereis* while on the wing—in fact, I took it for that bird until I handled a specimen. This is, I believe, a new record for Victoria, as it had not been previously recorded for that State.

Larus novæ-hollandiæ (*Bruchigavia novæhollandiæ novæhollandiæ*). Silver Gull.—Great numbers are met with both inside the Inlet and off the coast.

Stereorarius crepidatus (*Catharacta l. lonnbergi*). Richardson Skua.—Quite a number of these strange birds flew round our vessel. They were in many stages of plumage, from old birds in summer plumage (the elongated feathers in the tail being well pronounced) to the mottled immature plumage.

Hæmatopus longirostris (*H. ostralegus longirostris*). Pied Oystercatcher.—One or two pairs were observed, and a nest containing three eggs was found and photographed.

Hæmatopus fuliginosus (*H. niger fuliginosus*). Eastern Black Oystercatcher.—One or two pairs met with, but no nests were observed.

Lobivanellus lobatus (*Lobibyx novæhollandiæ*). Spur-winged Plover.—Quite a number were met with on the swampy country near the coast.

Charadrius fulvus (*Pluvialis dominicus fulvus*). Lesser Golden Plover.—Reported as having been seen near Naggi Lake and on the Goodwin Sands, an extensive area of sand in the lower harbour; most of it is covered at high tide.

Ægialitis ruficapilla (*Leucopoliis ruficapillus ruficapillus*). Red-capped Dottrel.—These birds were breeding on the sand-spit in the harbour and on the sand above high-water mark on the ocean beach. Nests containing three eggs were seen.

Numenius cyanopus (*N. cyanopus*). Australian Curlew.—One or two of these wary birds were seen on the sand-banks.

Limosa uropygialis (*Vetola lapponica baueri*). Eastern Barred-rumped Godwit.—A few of these birds were seen on the sand-banks, and specimens dissected were extremely fat. A layer of fat completely covered the body. This would lead one to think that some of these birds must remain in Australia at nesting time. It may be the first year's birds do not return to their nesting haunts in Siberia.

Pisobia ruficollis (*P. minuta ruficollis*). Eastern Little Stint.—Met with in flocks on sand-banks in the harbour.

Pisobia acuminata (*Limnocinclus acuminatus*). Sharp-tailed Stint.—Numbers were seen on the sand-banks.

Ancylochilus subarquatus (*Erolia ferruginea chinensis*). Curlew Sandpiper.—Found in small flocks on the sand-banks.

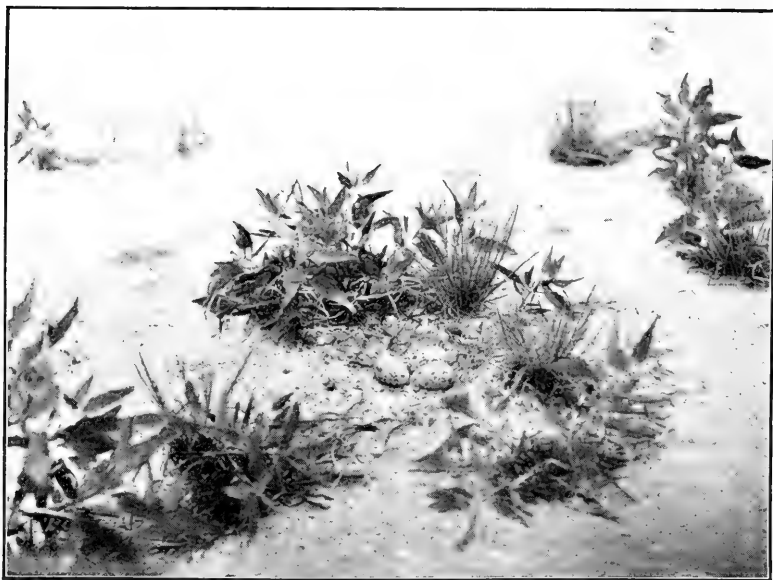
Gallinago australis (*Ditelmatis hardwickii*). Australian Snipe.—A few birds were flushed from the bracken in the gullies and on the slopes.

Notophoxyx novæ-hollandiæ (*N. novæhollandiæ*). White-fronted Heron.—A few were often observed wading in the shallow water at low tide, or perched on dead gums near the water.



Tawny-crowned Honey-eater.

FROM A PHOTO. BY A. H. E. MATTINGLEY.



Nest and Eggs of Pied Oyster-catcher.

FROM A PHOTO. BY J. T. HAMILTON.



Nycticorax caledonicus (*N. caledonicus australasiæ*). Australian Night-Heron.—Only one or two birds were observed.

Chenopsis atrata (*C. atrata*). Black Swan.—Great numbers were met with in the harbour and up the arms. There were many first year's birds with their parents. Great numbers of the old birds were moulting to such an extent they were unable to fly.

Anas superciliosa (*A. superciliosa rogersi*). Black Duck.—A few were seen on the rivers.

Nettion castaneum (*Virago castanea castanea*). Chestnut-breasted Teal.—One pair only was observed.

Nettion gibberifrons.* Grey Teal.—Not numerous.

Nyroca australis (*N. australis*). White-eyed Duck.—A pair with this year's young, fully fledged, was seen on the harbour.

Biziura lobata (*B. lobata*). Musk-Duck.—A few birds were seen upon the waters of the Inlet.

Phalacrocorax carbo (*P. c. novæhollandiæ*). Black Cormorant.—Fairly numerous.

Phalacrocorax sulcirostris (*Mesocarbo ater*). Little Black Cormorant.—Quite a number were met with in the bays and rivers.

Phalacrocorax hypoleucus (*Hypoleucus varius hypoleucus*). Eastern Pied Cormorant.—These birds were not numerous; only an odd one or two were seen.

Phalacrocorax melanoleucus (*Microcarbo melanoleucus*). Little Pied Cormorant.—Quite a number were seen in the bays and inlets.

Sula australis (*Morus serrator dyotti*). Australian Gannet.—A few were seen around our vessel going to and coming from the Inlet.

Pelecanus conspicillatus (*Catoptropelicanus conspicillatus conspicillatus*). Eastern Pelican.—One bird was seen upon the waters of the harbour.

Circus gouldi (*C. approximans gouldi*). Swamp-Hawk.—It was reported that one bird was seen in the marshy country.

Astur approximans (*Urospiza fasciata fasciata*). Australian Goshawk.—One of these birds was seen to swoop down upon a tea-tree and carry off a Finch's nest in its claws. On alighting upon the ground, it deliberately pulled out the young Finches (*Ægitha temporalis*) and began its meal. When disturbed it flew off.

Accipiter torquatus (*A. cirrocephalus cirrocephalus*). Collared Sparrow-Hawk.—One bird was seen several times in the same locality.

Uroæetus audax (*U. audax*). Wedge-tailed Eagle.—Not many of these fine birds came under observation. A few old nests were seen in the big dead gums near the water.

Haliæetus leucogaster (*Cuncuma leucogaster*). White-bellied Sea-Eagle.—A pair of these noble birds patrolled the Inlet morning and evening in search of food.

Haliastur sphenurus (*H. sphenurus*). Whistling-Eagle.—This bird was seen and heard, but was not plentiful.

* This species is not recognized in Mathews's 1913 "List."

Hieracidea berigora (*Ieracidea berigora berigora*). Brown Hawk.—Not numerous.

Cerchneis cenchroides (*C. cenchroides cenchroides*). Nankeen Kestrel.—Not plentiful; one or two birds seen.

Ninox boobook (*Spiloglaux boobook*). Boobook Owl.—It is remarkable that so few night-birds seem to frequent this locality. A Boobook Owl was heard calling at night, but if it be the Boobook or the sub-species, the Marbled Owl, it is hard to say.

Trichoglossus swainsoni (*T. novæhollandiæ novæhollandiæ*). Blue-bellied Lorikeet.—Large flocks of these birds passed over each day on their way to feeding grounds. The specimens handled varied much in colouration.

Glossopsitta concinna (*G. concinna*). Musk Lorikeet.—Numbers of these birds were found feeding on the young shoots and buds of the *Angophora* trees. Many of the specimens handled had a deep, bright blue frontal band; no doubt this is due to age.

Glossopsitta porphyrocephala (*G. porphyrocephala porphyrocephala*). Purple-crowned Lorikeet.—Not numerous; a few birds observed.

Glossopsitta pusilla (*G. pusilla*). Little Lorikeet.—These birds were found feeding upon the honey in the flower-spikes of the grass-tree (*Xanthorrhæa*).

Calyptorhynchus banksi (*C. banksii banksii*). Banksian Cockatoo.—Specimens secured were an adult male and female as well as a one-year-old bird, which proved to be a female. This bird, strange to say, had almost the plumage of the adult male, with the exception of a light sprinkling of yellow specks on the greater and lesser wing coverts; the band across the tail, instead of being vermilion, as in the adult male, had the external margin of the feathers light red, with irregular bars of black, half of the inner margins light red and the other half yellow, also crossed by irregular black bars, with a narrow margin of yellow on each side; under tail coverts glossy black; two centre tail feathers and the tips of all the other feathers glossy black. The principal contents of the stomach were the seeds of casuarinas and banksias, with a few insect larvæ.

Calyptorhynchus funereus (*C. funereus funereus*). Black Cockatoo.—A good many of these birds were met with near the sand-dunes along the coast. Three specimens came under the notice of the writer—an adult female and two immature males. They seem to agree with the Queensland and New South Wales birds both in size and colouration. The immature males, which would be between one and two years old, resemble the female in colouration. The yellow of the tail of the older bird of the two is speckled over with dark specks; the other is heavily blotched. Their bills, like that of the female, are nearly white. The stomachs contained banksia, casuarina, and grass seeds, the latter principally the seeds of a flat-leaved plant growing on the sand-dunes.

Callocephalon galeatum (*C. galeatum*). Gang-Gang Cockatoo.—Quite a number of these little Cockatoos were met with amongst the heavily-timbered country; most were immature birds in their first year's plumage. They visited the deep, damp gullies where the acacias grew; the seeds of these trees seem to be the principal food of the Gang-Gang at this time of the year. When passing through

the timber country late in the afternoon, the low, growling notes of these birds when feeding were often heard. The immature males in the first year's plumage have but a short crest, much mottled with grey; wings, breast, and abdomen are barred and mottled with light yellow; many of the feathers of the abdomen are barred with pink. When dissected the stomachs were found to be packed with the green acacia seeds, and the birds smelt very strongly of this plant.

Aprosmitus scapulatus (*Alisterus cyanopygius neglectus*). Victorian King Parrot.—This bird was not numerous; there were a few old birds, accompanied by immature young in the first year's plumage. The low and plaintive note of this bird is in strong contrast to the typical calls of the Parrot family.

Platycercus pennanti (*Platycercus elegans elegans*). Crimson Parrot.—It was reported that this bird had been seen.

Pezoporus formosus (*P. terrestris terrestris*). Ground-Parrot.—This lovely Parrot is becoming very rare, and it will not be long before it will be, like the Night-Parrot, almost extinct. Two birds were flushed in the heath country, one being secured; but, despite all efforts, the second bird could not be flushed again.

Alcyon azurea (*A. azurea victoriæ*). Victorian Blue Kingfisher.—Not plentiful; one or two specimens seen on the wing passing along the rivers.

Dacelo gigas (*D. gigas gigas*). Brown Kingfisher.—One would expect to meet with these birds in great numbers amongst the fine forest country, but they were not at all numerous. A few pairs were found nesting.

Halcyon sanctus (*Sauropatis sancta sancta*). Sacred Kingfisher.—Only one or two examples of this species came under observation.

Chætura caudacuta (*C. caudacuta*). Spine-tailed Swift.—Numbers were seen flying round during a close, thundery day.

Cuculus pallidus (*Heteroscenes pallidus pallidus*). Pallid Cuckoo.—Numerous, calling loudly. Females dissected present the distinct phase of plumage already described by me in *Emu*, vol. xiii., p. 24; *South Australian Ornithologist*, vol. i., part 5.

Cacomantis flabelliformis (*C. rubricatus rubricatus*). Fan-tailed Cuckoo.—The long-drawn, weird call of this bird was often heard in the open forest country.

Chalococcyx basalis (*Neochalcites basalis mellori*). Narrow-billed Bronze-Cuckoo.—This bird was reported as having been seen.

Chalococcyx plagosus (*Lamprococcyx plagosus plagosus*). Bronze-Cuckoo.—Only met with on one or two occasions.

Menura victoriæ (*M. novæhollandiæ victoriæ*). Victoria Lyre-Bird.—I have placed this bird under the Victorian species, which is, no doubt, its right place; still, not having handled a specimen, one cannot be sure. In all the deep, fern-clad gullies the presence of this bird was indicated on all sides by the scratchings in search of food. A pair was seen on one occasion, and their calls were often heard. From local information it was ascertained that these birds were once very plentiful in this district, but of late years they have become rare. This is put down to the increase of the imported fox.

Hirundo neoxena (*H. neoxena neoxena*). Welcome Swallow.—

Observed near the homesteads. A pair had built under the foredeck of a motor-boat which we were out in almost every day. The birds followed the boat all day, although we took many long trips.

Petrochelidon nigricans (*Hylochelidon nigricans caleyi*). Tree-Swallow.—These birds were in numbers, and no doubt were looking out their nesting-sites amongst the dead timber.

Petrochelidon ariel (*Lagenoplastes ariel ariel*). Fairy Martin.—This bird was reported as having been seen.

Microeca fascians (*M. fascians fascians*). Australian Brown Flycatcher.—Was not nearly as plentiful as one would expect in such a likely country. No sign of nesting was seen.

Petroica leggii (*P. multicolor frontalis*). Southern Scarlet-breasted Robin.—Many pairs would be met with in a day amongst the timber. They were only building their nests in some instances, while in others fully-fledged young were about with the parent birds.

Petroica phœnicea (*Littleria chrysoptera phœnicea*). Flame-breasted Robin.—Not at all plentiful. On comparing specimens it was found that they were most like the New South Wales birds, being very light in colour alongside our South Australian species.

Gerygone, sp. (?)—There was certainly a species of this genus in the district, but all efforts to identify it failed.

Pachycephala gutturalis (*P. pectoralis youngi*). Victorian Thick-head.—Numerous; their beautiful notes resounded through the forest. In many instances we found them at the time of nidification.

Pachycephala rufiventris (*Lewinornis rufiventris rufiventris*). Rufous-breasted Thickhead.—Fairly numerous, and was heard singing each day amidst the thick scrub where it was nesting.

Eopsaltria australis (*Eopsaltria A. viridior*). Green-rumped Shrike- Robin.—Plentiful, and they were nesting at the time. They seem to prefer the open forest country to the thick scrub.

Rhipidura albiscapa (*R. flabellifera victoriæ*). Victorian Fantail.—Very numerous. Many nests containing both eggs and young were seen:

Rhipidura rufifrons (*Howeavis rufifrons inexpectata*). Victorian Rufous Fantail.—Only met with amidst the thick jungle of the fern-tree gullies. The call and habits are very similar to those of the preceding species.

Rhipidura motacilloides (*Leucocirca tricolor tricolor*). Black-and-White Fantail.—Met with in the open country and round the homesteads.

Monarchea carinata (*M. melanopsis melanopsis*). Black-faced Flycatcher.—A rare bird. Those seen showed a preference for the deep fern-tree gullies and the thickest jungle.

Graucalus melanops (*Coracina novæhollandiæ melanops*). Black-faced Cuckoo-Shrike.—A common bird, met with in almost every locality.

Graucalus mentalis (*Coracina robusta robusta*). Little Cuckoo-Shrike.—Only one example of this species came under my notice, and I have nowhere found it a common bird. The specimen showed faint barring across the abdomen.

Edoliisoma jardi (*Metagraucalus tenuirostris tenuirostris*). Great Caterpillar-eater.—This bird was reported as having been seen.

Campephaga humeralis (*Lalage tricolor tricolor*). White-shouldered Caterpillar-eater.—Very numerous. A number of nests, mostly containing young, were seen.

Cinclosoma punctatum (*C. punctatum neglectum*). Victorian Spotted Ground-Bird.—Not plentiful; shy. A young bird fully fledged was taken.

Pyenoptilus floccosus (*P. floccosus sandlandi*). Victorian Pilot-Bird.—Mr. A. H. E. Mattingley reported having seen this bird amidst the jungle in a deep gully.

Psophodes crepitans (*P. olivaceus scrymgeouri*). Victorian Coach-whip-Bird.—A very common bird, and its cracking call was heard in every gully where the undergrowth was thick.

Calamanthus albiloris (*C. fuliginosus albiloris*). White-lored Field-Wren.—Not common; met with amongst the heath country near the coast, where a nest and three eggs were taken.

Cincloramphus rufescens (*Ptenædus mathewsi vigors*). Eastern Rufous Song-Lark.—One specimen only came under observation.

Ephthianura albifrons (*E. albifrons albifrons*). White-fronted Chat.—Quite a number were seen in the open country near the coast. Many were nesting, and large young and eggs were seen.

Megalurus gramineus (*Poodytes gramineus wilsoni*). Victorian Grass-Bird.—A specimen of this bird was secured, I believe. Not having access to the specimen, I have placed it under the Victorian sub-species.

Acanthiza pusilla (*A. pusilla macularia*). Victorian Brown Tit.—These little birds were very plentiful, hopping over and under the fallen timber in the scrub land in search of insects.

Acanthiza lineata (*A. lineata chandleri*). Victorian Striated Tit.—Numbers of these birds were met with in the timber country. They were incessantly moving and uttering their sharp little clicking note. On comparing specimens it was found that the Mallacoota birds, being very dark on the back, most resembled the Kangaroo Island specimens.

Acanthiza chrysorrhous (*Geobasileus chrysorrhous sandlandi*). Victorian Yellow-rumped Tit.—Not plentiful; met with in the more open country.

Acanthiza reguloides (*Geobasileus reguloides connectens*). Victorian Buff-rumped Tit.—The specimens secured show a great deal more yellow with the buff in comparison with South Australian birds. They were found amongst the high bracken ferns.

Sericornis frontalis (*S. longirostris longirostris*). Victorian Scrub-Wren.—Very common in nearly all the damp gullies. They keep to the thick undergrowth during the middle of the day, but in the morning and evening they were seen hopping about on the short grass in search of insects. At the least sound they would dart into cover.

Malurus cyaneus (*M. cyaneus henriettæ*). Victorian Blue Wren.—Very plentiful. The blue on head and mantle of these birds is very

pale, and approaches the colour of *M. c. cyanocephalus*. Many of these birds were nesting.

Stipiturus malachurus (*S. malachurus tregellasi*). Victorian Emu-Wren.—Plentiful amidst the cutting-grass near the coast. Numbers were found nesting. The young males take the blue colouration with the first feathers in the nest.

Sphenura brachyptera (*S. brachyptera*). Bristle-Bird.—Rare, frequenting the low, stunted tea-tree growing on marshy country near the coast.

Artamus sordidus (*Pseudartamus cyanocephalus*). Wood-Swallow.—A common bird. Nesting.

Artamus superciliosus (*Campbellornis superciliosus superciliosus*).—One company of birds was seen and one nest, containing eggs, was observed.

Colluricincla harmonica (*C. harmonica victorica*). Victorian Grey Shrike-Thrush.—Met with in nearly every locality.

Grallina picata (*G. cyanoleuca cyanoleuca*). Magpie-Lark.—One or two birds came under notice, and a nest was seen.

Gymnorhina leuconota (*G. hypoleuca leuconota*). White-backed Magpie.—Not a plentiful bird.

Cracticus destructor (*Bulestes torquatus torquatus*). Collared Butcher-Bird.—Only one or two birds were seen.

Neositta chrysoptera (*N. chrysoptera lathamii*). Victorian Tree-runner.—A small party of five or six, comprising parent and immature birds, were moving about very silently high up in the gums.

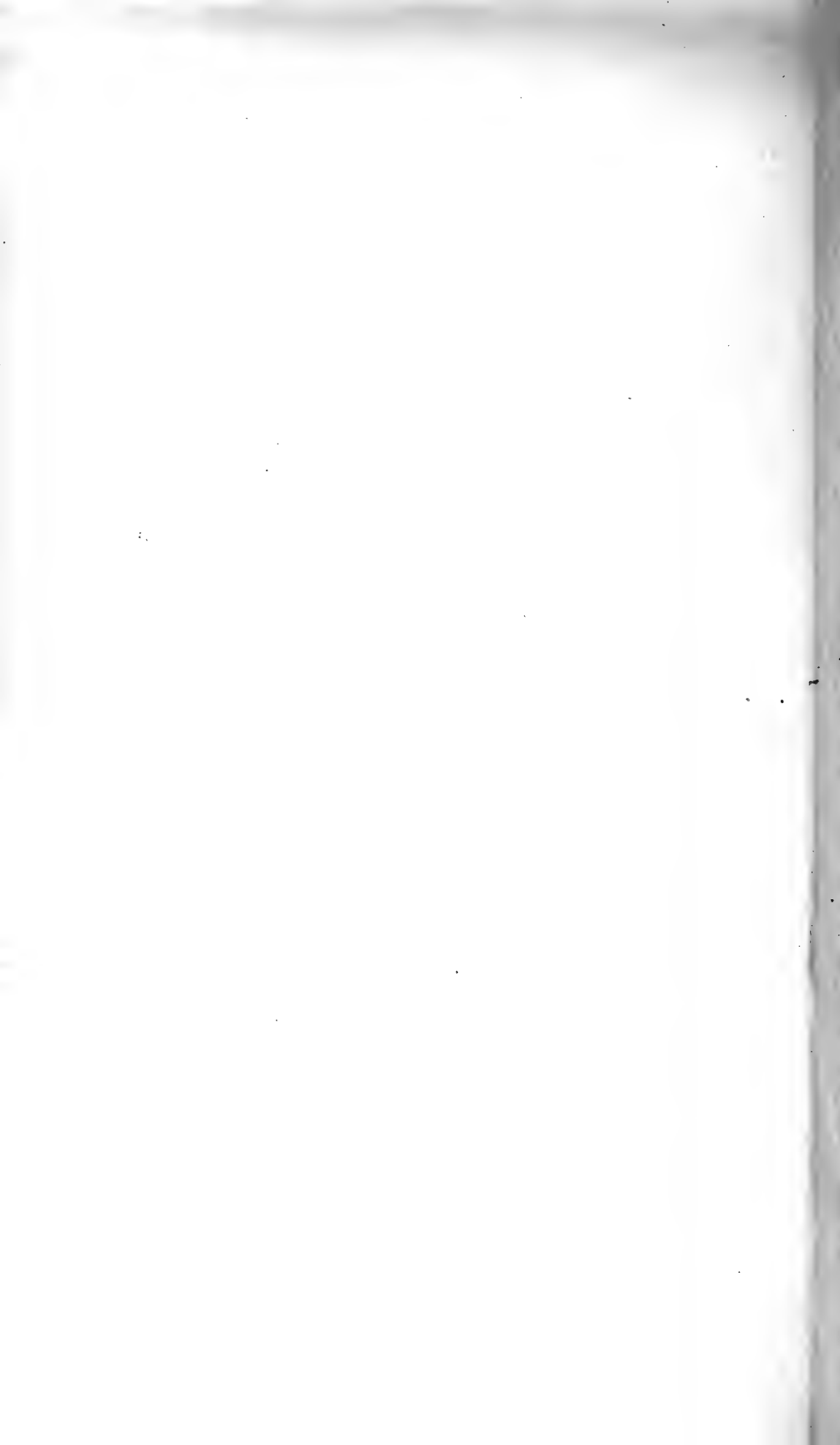
Climacteris leucophæa (*C. leucophæa leucophæa*). White-throated Tree-creeper.—Very plentiful, especially amongst the *Angophora* trees near the coast. They were nesting at the time of our visit, and nests containing young were observed. Many of the immature birds, in their first year's plumage, accompanied the mature birds. The females of the former were adorned with deep rufous upper tail coverts, which colouration appears on the young in the nest, and which they retain for the first year. Strange to say, two singular features are connected with the females of this species. One is having a small orange-coloured spot just below the ear coverts—this distinguishes the female at once from the male; the other is that it seems almost certain that the immature of this sex alone develop the bright rufous colouration on the rump and upper tail coverts. John Gould, like others, described the immature female of this species as a distinct species (*C. pyrrhonota*), but afterwards found his mistake. On comparing adult specimens with those from South Australia, it is found that the latter birds are larger and lighter on the back, while those from Queensland are much darker above and below. The nest is in a hollow branch, deep down, neatly constructed of grass; it usually contained three eggs. One nest observed contained two young and an egg; both young birds showed the red colouration appearing with the first feathers on the rump.

Zosterops dorsalis (*Z. lateralis westernensis*). Southern White-eye.—Very plentiful. They were breeding in many localities. Several nests containing eggs were seen, and the eggs appeared to be a little larger than the average of those of the South Australian bird. On comparing the birds I find that the specimens from Mallacoota



Emu-Wren's Nest and Three Fledgelings.

FROM A PHOTO. BY A. H. E. MATTINGLEY.



approach much more closely the Kangaroo Island bird (*Z. hal-maturina*) than the mainland birds, the grey of the back and the yellow of throat and head being much more pronounced than it is in either the South Australian or Bass Strait island birds.

Pardalotus punctatus (*P. punctatus interjectus*). Victorian Spotted Pardalote.—This was the only species that came under our notice, and even this one was not common, which seems strange, considering what a fine timbered country it is.

Melithreptus lunulatus (*M. lunatus lunatus*). White-naped Honey-eater.—Fairly numerous amongst the timber. When moving about in the tops of the very high trees they look more like bees than birds. This is a more robust bird in comparison to the South Australian sub-species.

Acanthorhynchus tenuirostris (*A. tenuirostris victoriæ*). Victorian Spinebill.—There were quite a number of these dainty little birds. They seemed to frequent the open timber and bush-land alike.

Glyciphila fulvifrons (*G. melanops chandleri*). Victorian Tawny-crowned Honey-eater.—Were met with on the heath country near the coast, where they were breeding. Specimens handled showed a very light forehead, in some cases almost white.

Ptilotis chrysops (*Paraptilotis chrysops beaconsfieldi*). Southern Yellow-faced Honey-eater.—Numerous; they seemed to take the place of *P. penicillata*, which they resemble much in habits. They were nesting in the tea-tree. Their short but melodious note was heard on every side in the early morning and evening.

Ptilotis chrysotis (*Meliphaga lewinii nea*?). Yellow-eared Honey-eater.—Only two birds came under notice. They were very silent. One bird was feeding on the native cherries, which were ripe at the time of our visit. Not having sufficient material for comparison, it is difficult to say if this is the New South Wales or Victorian form.

Lichmera australasiana (*Phylidonyris pyrrhoptera indistincta*). Crescent Honey-eater.—Not plentiful; more often heard than seen.

Meliornis novæ-hollandiæ (*M. novæhollandiæ assimilis*). White-bearded Honey-eater.—A fair number of these birds made their presence known by their sharp squeaking call and by the erratic way they fly out from cover, and on alarm dive back into the undergrowth. With its thick and long bill, this bird is unlike the Queens-land, New South Wales, and South Australian specimens, and has a closer affinity to those found on the islands of Bass Strait.

Manorhina melanophrys (*M. melanophrys yarra*). Bell Miner.—Not plentiful; restricted to a very small area, where they kept up their clear, bell-like note incessantly. Very pugnacious, chasing all birds, both large and small, that come in their way, drooping their wings and fluffing out their feathers as signs of combat. They are very like the *Myzantha* in habits.

Anthochaera carunculata (*Coleia carunculata tregellasi*). Red Wattle-Bird.—This bird was reported as having been seen. I notice Mr. Mathews calls this the Yellow Wattle-Bird; the Tasmanian bird is the one always known to Australian ornithologists as the Yellow Wattle-Bird.

Anellobia mellivora (*Anthochaera chrysoptera intermedia*). Brush Wattle-Bird.—This was a very plentiful bird all through the district.

Tropidorhynchus corniculatus (*T. corniculatus corniculatus*). Friar-Bird.—I was informed that a specimen of this species was taken by a member.

Anthus australis (*A. australis australis*). Australian Pipit.—Met with on the heath country near the coast, and in the clearings. There is no doubt this bird fits in with the description given by Gould.

Stagonopleura guttata (*S. guttata philordi*). Spotted-sided Finch.—Not numerous; observed on one or two occasions in the clearings.

Ægitha temporalis (*Æ. temporalis tregellasi*). Red-browed Finch.—Numerous in all the clearings. Not having handled a specimen, it is impossible to say to which sub-species it belongs.

Ptilonorhynchus holosericeus (*P. violaceus violaceus*). Satin Bower-Bird.—A few of these birds were met with on the Dowell River amidst the thick sub-tropical jungle. They are wary birds when once alarmed, and the males in full plumage are very difficult to approach. The fruit of the wild cherry seemed to be attracting them.

Corvus coronoides (*C. coronoides perplexus*). Australian Raven.—Although a specimen was not secured, there is little doubt the above naming will be correct.

Strepera graculina (*S. graculina graculina*). Pied Crow-Shrike.—I feel sure there were two species in the district. This was the only one I was able to identify positively.

Australian Cuckoos.

BY H. L. WHITE, R.A.O.U. (SCONE, N.S.W.)

INTRODUCTION.

FOR more than 30 years Cuckoos' eggs have had a great attraction for me, and upon every possible occasion I have tried to add to my collection, which I now look upon as fairly complete, though there will always be what I call chance combinations to be added. It is evident to anyone who has given the matter a close study that the various species of Cuckoos have their favourite foster-parents, and that these are not very numerous; outside of these favourites are what I term "chance," or, perhaps more properly, "occasional," foster-parents, which are used now and then.

There is no doubt in my mind that Australian Cuckoos which lay in open nests usually select as foster-parents those birds whose eggs nearly approach their own in colouration. A casual glance at my collection gives the impression that my theory is incorrect, as one's gaze is met by many colours that do not harmonize, however uniform the general appearance may be. A visitor often exclaims, "Oh! look here! and here! and here! these differ altogether." "Quite so," I admit, "but please to remember that those you point out are 'occasional' combinations only. Examine these dozen combinations of 'favourites,' forming perhaps 90 per cent. of the foster-parents used by this particular Cuckoo. Do not they harmonize?" The answer is invariably, "Yes, of course they do!"

Australian Cuckoos.

By H. L. WHITE, R.A.O.U. (SCONE, N.S.W.)

KEY TO THE PLATES.

PLATES 13A and 13B.—Drawer K contains eggs of the following Cuckoos :—

Neochalcites basalis melli.
Neochalcites basalis modestus.
Neochalcites basalis wyndhami.
Neochalcites russatus.
Neochalcites basalis melli.
Neochalcites basalis modestus.
Neochalcites basalis wyndhami.
Neochalcites russatus.
Neochalcites barnardi.

PLATES 13C and 13D.—Drawer L contains eggs of the following Cuckoos :—

Cacomantis castaneiventris.
Owenavis osculans osculans.
Owenavis osculans rogersi.
Lamprococcyx lucidus.
Lamprococcyx plagosus plagosus.
Lamprococcyx plagosus tasmanicus.
Lamprococcyx plagosus plagosus.
Lamprococcyx plagosus tasmanicus.
Lamprococcyx plagosus carteri.
Lamprococcyx minutillus minutillus.
Lamprococcyx minutillus perplexus.

Combination clutches—

Lamprococcyx plagosus plagosus.
Neochalcites basalis modestus.

PLATES 13E and 13F.—Drawer M contains eggs of the following Cuckoos :—

Cacomantis rubricatus rubricatus.
Cacomantis pyrrophanus variolosus.
Cacomantis pyrrophanus dumetorum.
Cacomantis pyrrophanus westwoodia.
Cacomantis rubricatus rubricatus.
Cacomantis rubricatus athertoni.
Cacomantis rubricatus albani.
Cacomantis pyrrophanus variolosus.
Cacomantis pyrrophanus dumetorum.
Cacomantis pyrrophanus westwoodia.

Combination clutches—

Cacomantis rubricatus rubricatus.
Neochalcites basalis melli.
Cacomantis rubricatus rubricatus.
Cacomantis pyrrophanus variolosus.

PLATES 13G and 13H.—Drawer N contains eggs of the following Cuckoos :—

Cuculus optatus.
Heteroscenes pallidus pallidus.
Heteroscenes pallidus pallidus.

PLATE 13I.—Drawer O contains eggs of the following Cuckoos :—

Heteroscenes pallidus pallidus.
Heteroscenes pallidus occidentalis.
Eudynamys orientalis cyanocephalus.
Eudynamys orientalis flindersii.
Eudynamys orientalis subcyanocephalus.
Scythrops novæhollandiæ novæhollandiæ.



PLATE 13A.

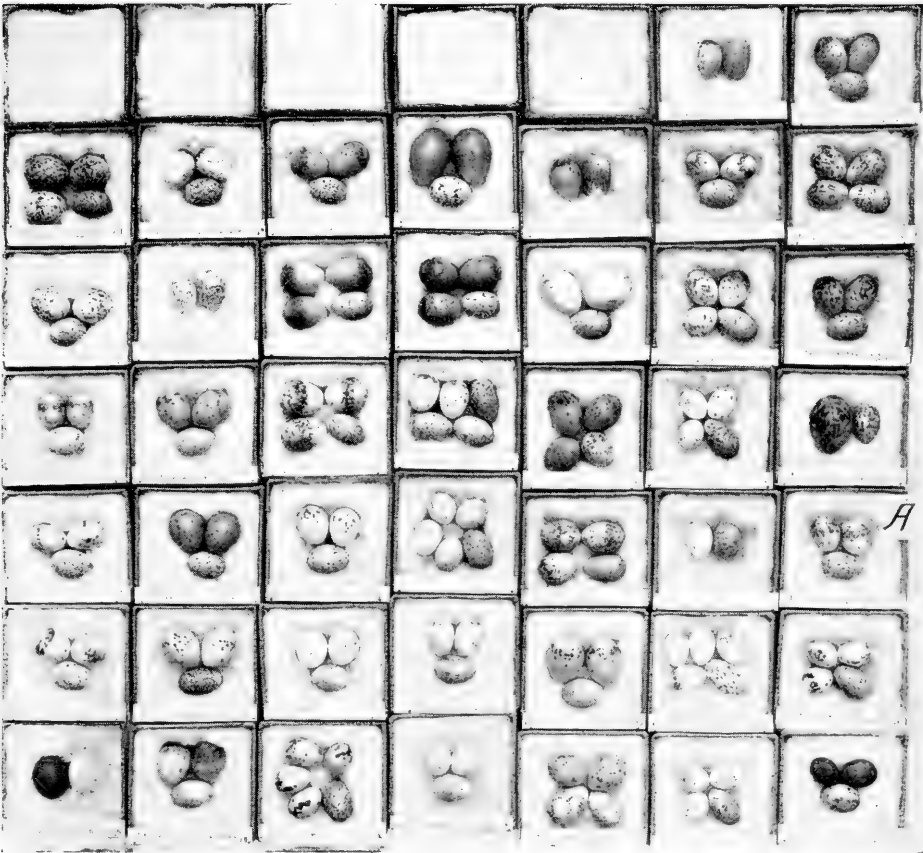


PHOTO. BY SID W. JACKSON, R.A.O.U.

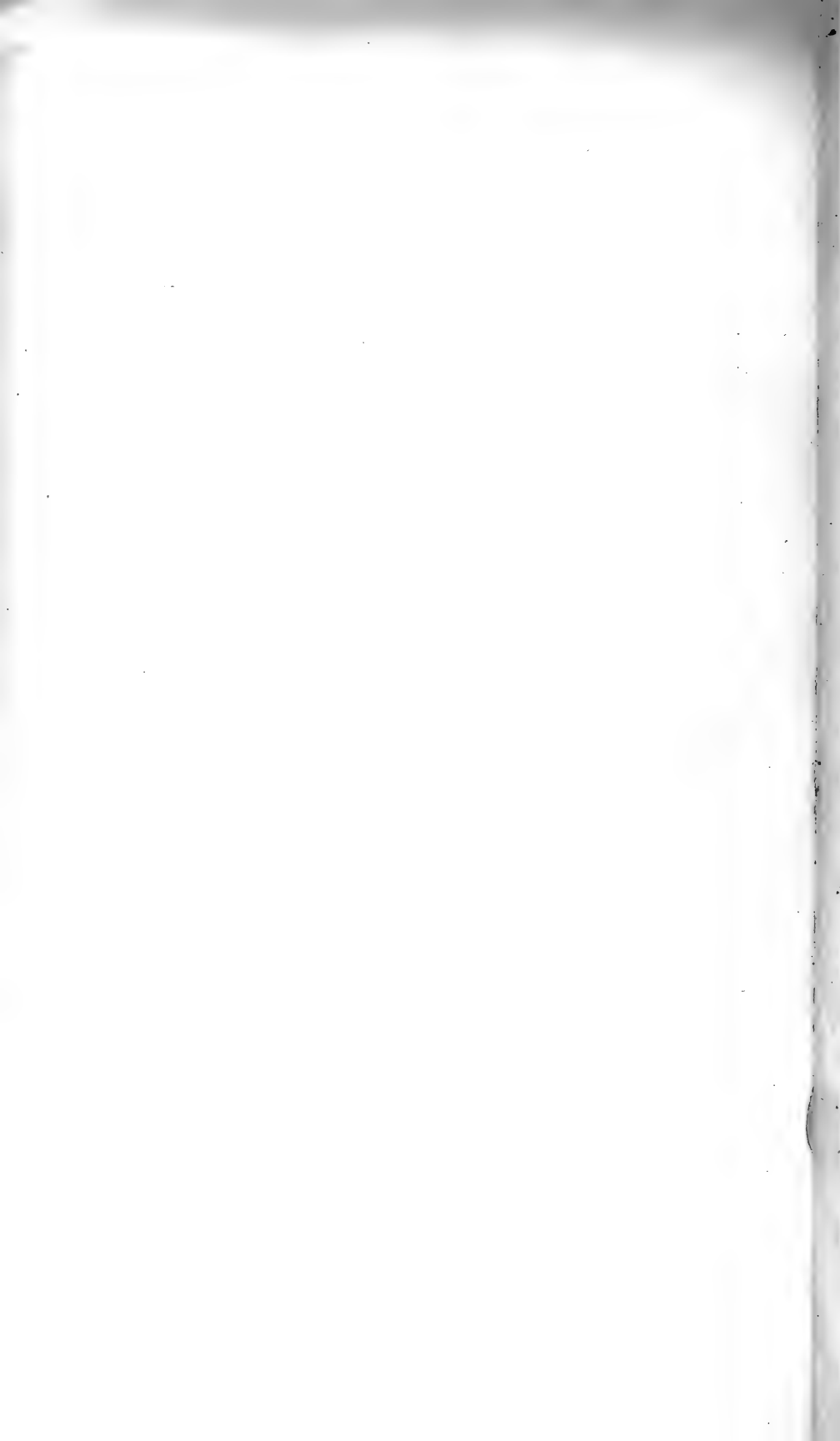


PLATE 13B.

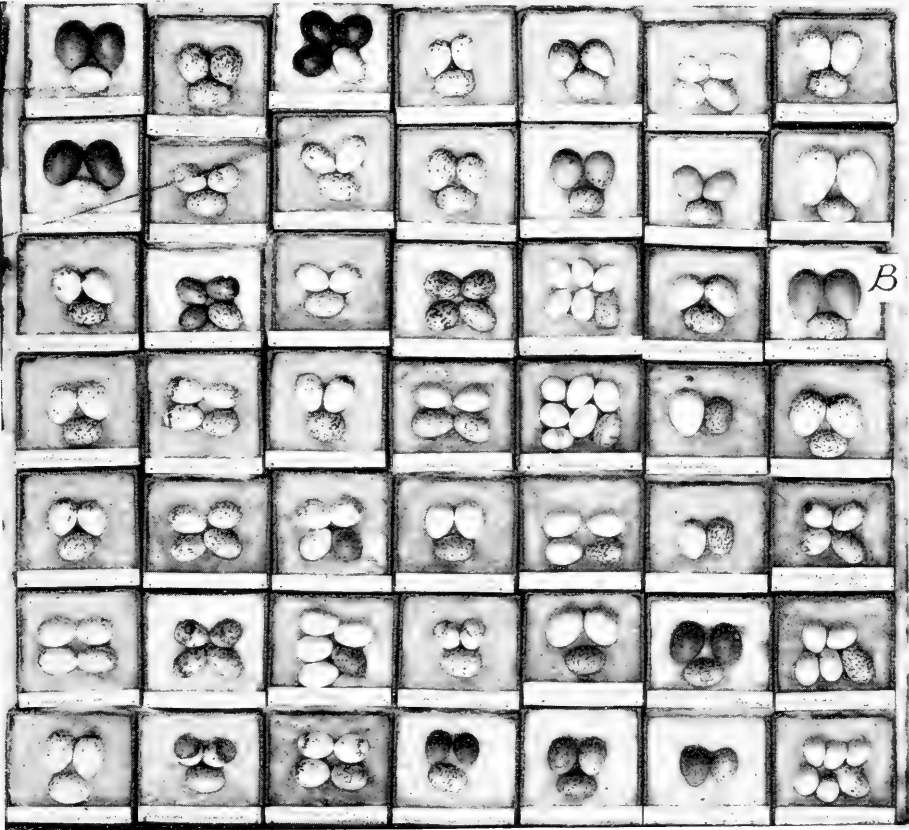
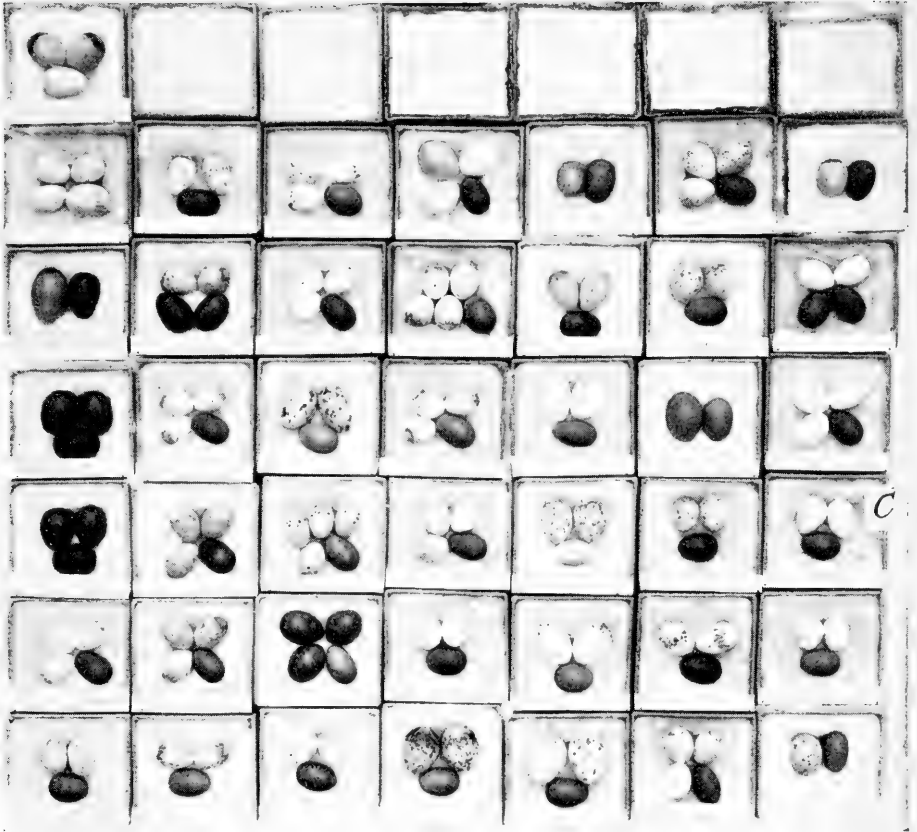


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PLATE 13c.



1000 1000 1000

PLATE 13d.



PHOTO. BY SID. W. JACKSON, R.A.O.U.



PLATE 18E.

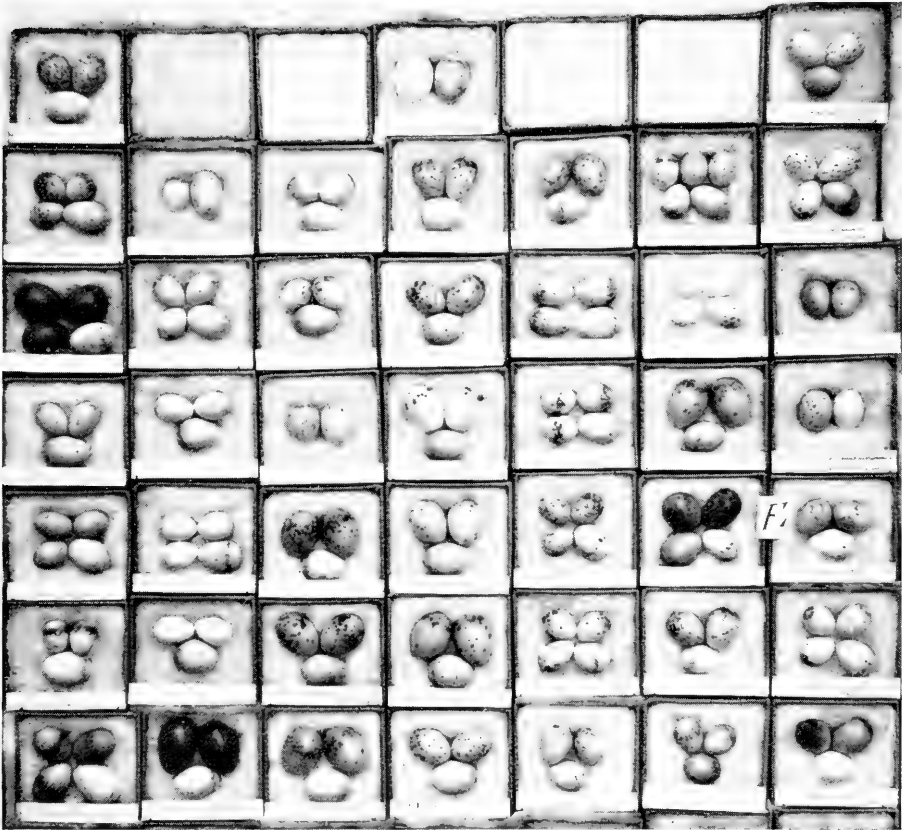


PHOTO. BY SID. W. JACKSON, R.A.O.U.

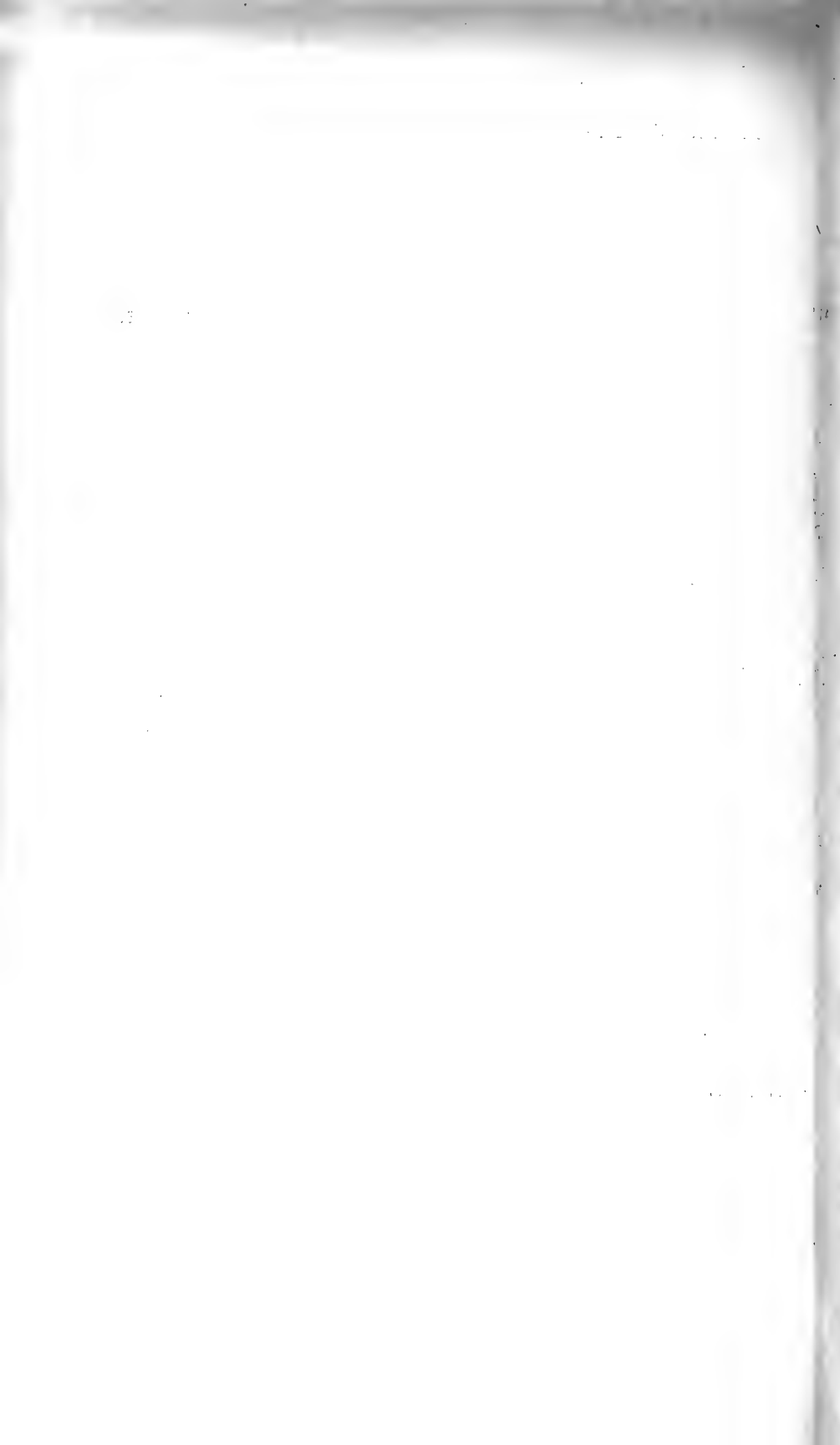


PLATE 13F.

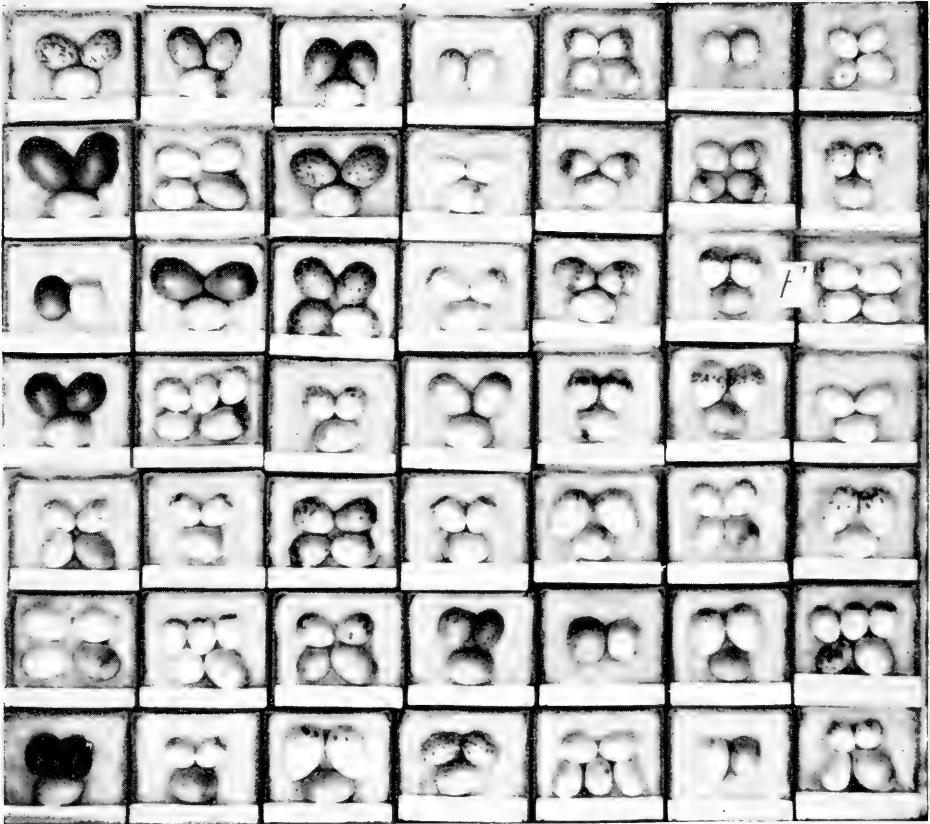


PHOTO. BY SID. W. JACKSON, R.A.O.U.

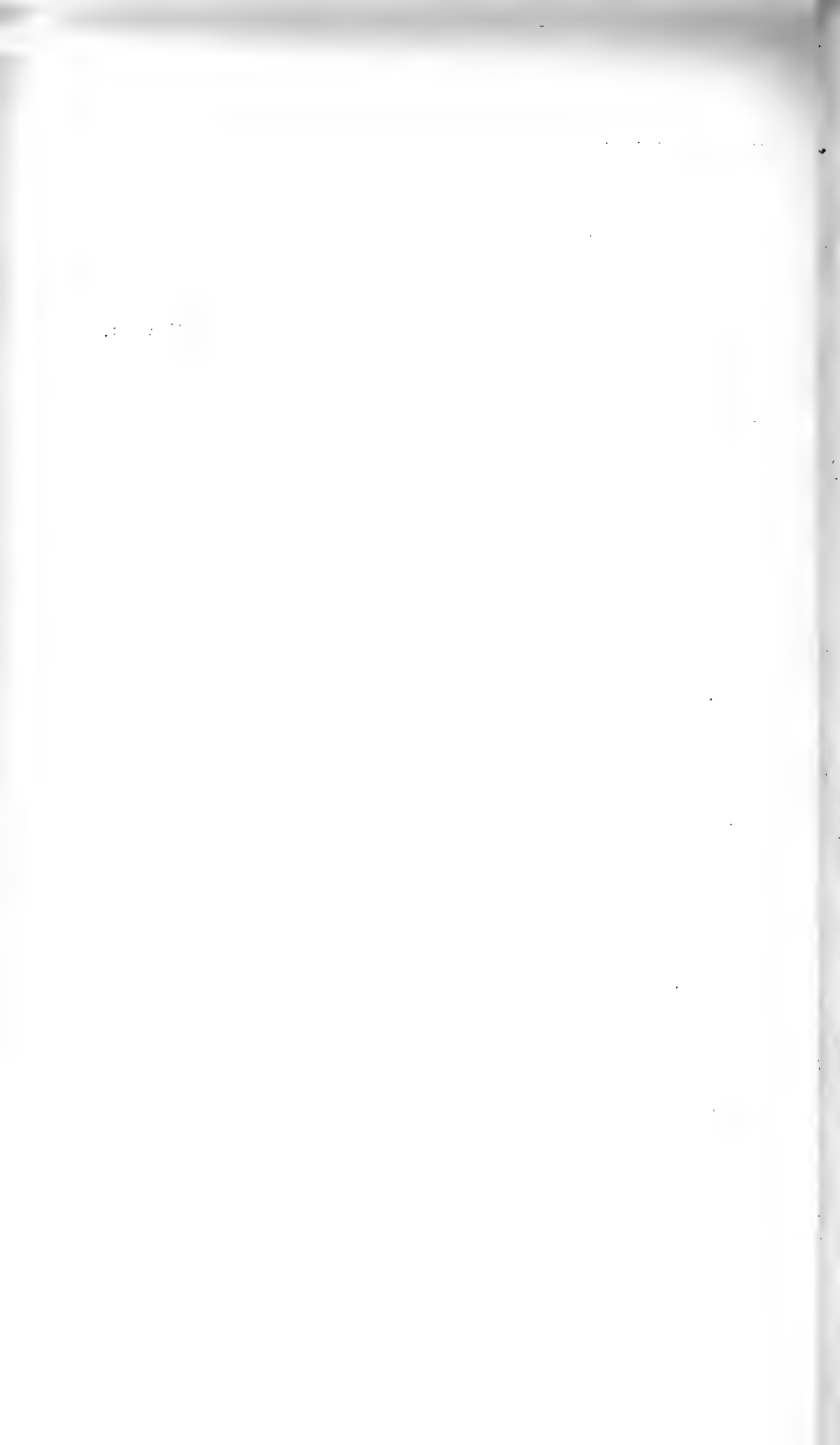


PLATE 136.

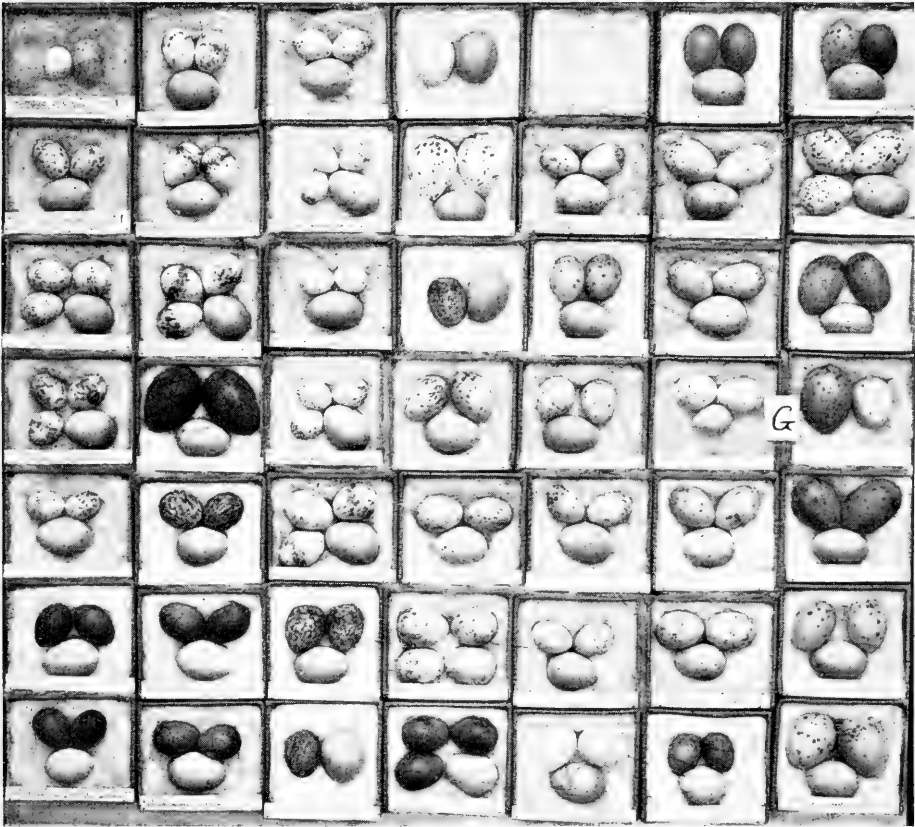


PHOTO. BY SID W. JACKSON, R.A.O.U.

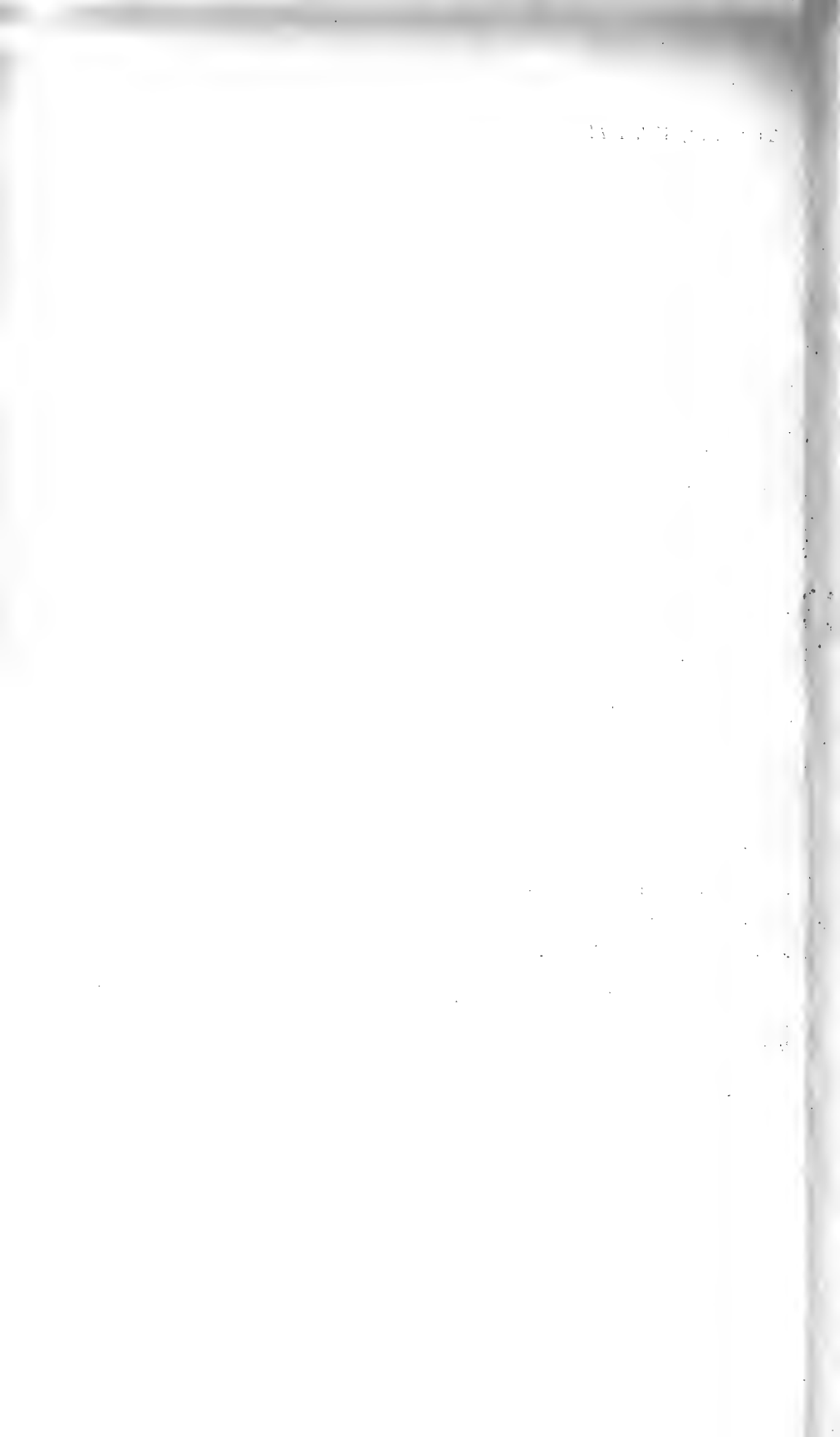
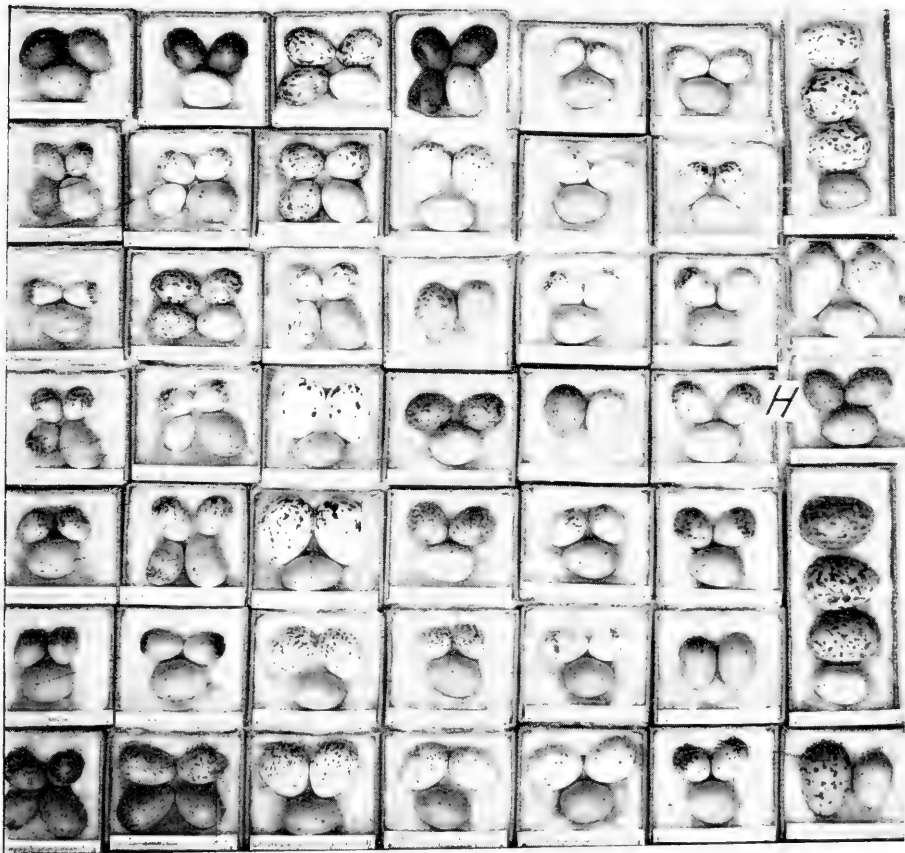
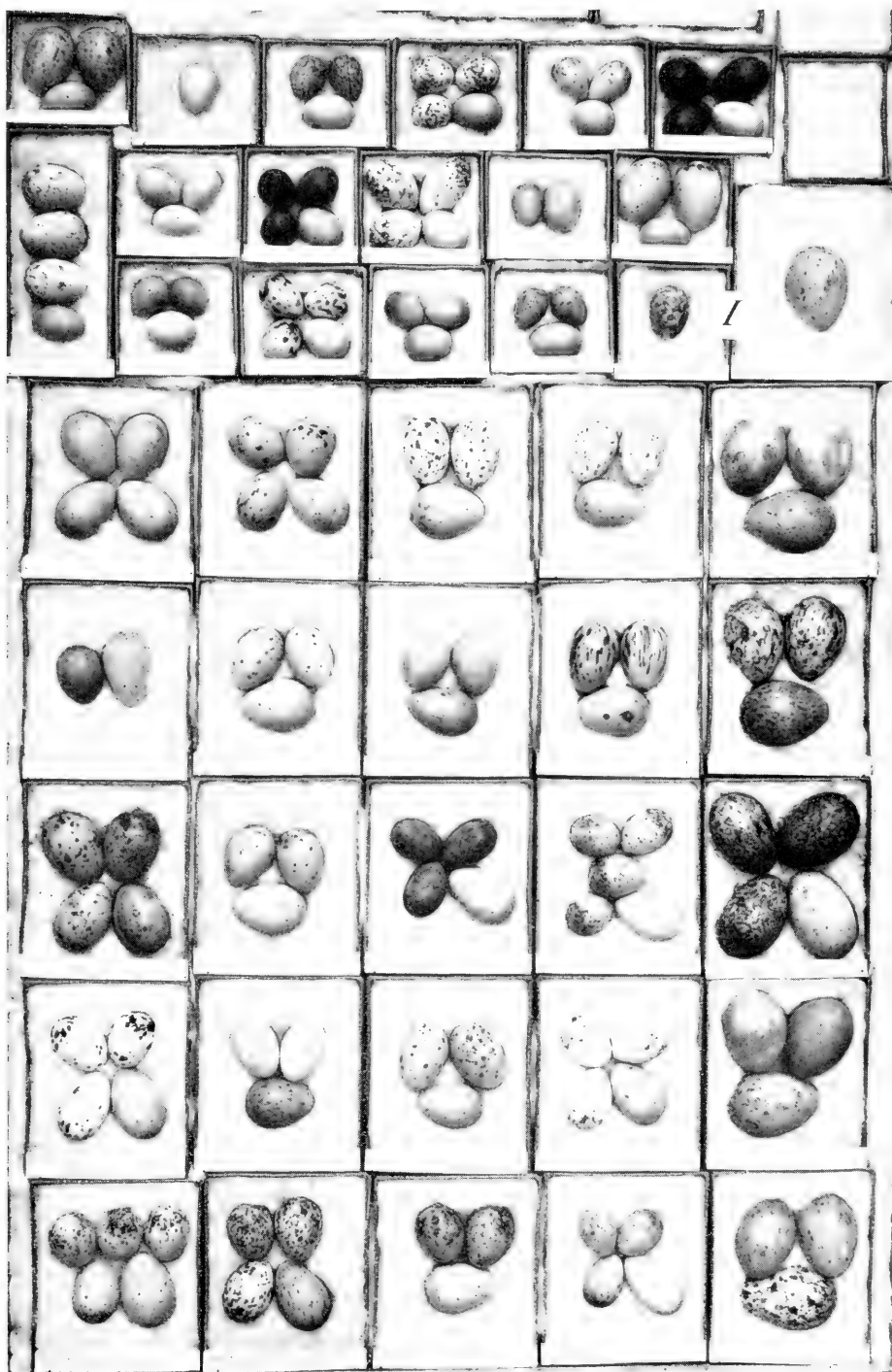


PLATE 13H.



PHOTO, BY SID. W. JACKSON, R.A.O.U.







Taking the species of foster-parents as a whole, say those used by the Pallid Cuckoo (*Cuculus pallidus*), in 100 species, it will probably be found that 60 of them do not harmonize. This does not disprove my theory in the proportion of 6 to 4; it simply proves that I have been to very great trouble in collecting 60 "occasionals," while all the time the 40 contain "favourites" which are used in 90 out of 100 cases. Scientists say that I am wrong, and that I cannot prove my case. Well, perhaps I cannot to their satisfaction; but there can be no harm in giving the result of my experience and observation, as quoted above. There is so much to be learned about Cuckoos that the most experienced of us can be looked upon as beginners only. Any information at all, therefore, should be welcomed.

A friend lately wrote, stating that a female Cuckoo which he shot contained three eggs, and asked me whether it had been definitely settled that Cuckoos sometimes placed more than one of their eggs in a nest. I replied that, with the exception of *Scythrops*, I knew of no Cuckoo which habitually placed more than one egg in a nest. I have seen two young *Scythrops* in a Raven's nest and two in that of a *Strepera*, while Dr. W. Macgillivray records, in a previous issue of the *Emu*, five in a Crow's nest. We occasionally see two Bronze-Cuckoos' (*Chalcococcyx plagosus*) eggs in a nest, but I have not noted two young together. I possess a clutch of three Pallid Cuckoos' eggs found by themselves in a *Ptilotis* nest, but at the time Cuckoos swarmed in the locality, and the eggs in question were probably laid by different birds.

In arranging my collection and compiling the following list I have adopted Mr. G. M. Mathews's system of trinomial nomenclature for Australian birds, which, I think, will sooner or later be used by everyone. Whether his separation of the genera will meet with the same appreciation is open to doubt, as, in my humble opinion, the trinomial system should tend to lumping rather than to splitting up of a genus. However, that Mr. Mathews is our most up-to-date authority upon Australian birds very few will dispute; it behoves us, therefore, to keep in touch with him and render every assistance possible in the compilation of the great work upon which he is engaged.

I have been accused by unthinking people of destroying bird-life in the collecting of eggs in what they term a wholesale manner; but a moment's reflection should satisfy my critics that a collection the size of mine—the formation of which has spread over 30 years, while specimens have come from almost every part of Australia—represents an infinitesimal proportion of the eggs laid; that natural enemies destroy thousands of eggs for every one taken for scientific purposes; that the killing of one pair of birds is more destructive than the taking of a dozen eggs; and that one town sportsman (?) will do more harm in a week than my collecting does in fifty.

If my collecting has done harm in other parts, it has certainly

not had the same effect here, where the whole estate is practically a bird sanctuary ; where nests are to be seen by dozens in the homestead garden,* and where the public school has an egg collection, which helps to instil a love for birds into the hearts of the children, and at the same time satisfies their curiosity. At one time it was the children's custom to knock over a nest in order to see the colour of the eggs ; the same object is now achieved by looking at the collection.

I consider that the future preservation of our native birds is largely in the hands of the public school teachers.

LIST OF AUSTRALIAN CUCKOOS' EGGS,

Together with those of various foster-parents, in the possession of Henry L. White, Esq., R.A.O.U., Belltrees, Scone, New South Wales.

(The numbers refer to the number of the species in the "Official Check-list of the Birds of Australia.")

CUCKOO.	FOSTER-PARENT.
<i>Cuculus optatus</i> (<i>C. optatus</i>), Australian Cuckoo	<i>Phyllergates coronatus</i> (Japan sp.)
<i>Cuculus pallidus</i> (<i>Heteroscenes pallidus pallidus</i>), Pallid Cuckoo	388 <i>Micræca fascians fascians</i>
"	392 <i>Petroica multicolor frontalis</i>
"	393 <i>Littleria chrysoptera chrysoptera</i>
"	394 <i>Whiteornis goodenovii quoyi</i>
"	397 <i>Melanodryas cucullata vigorsi</i>
"	397 <i>Melanodryas cucullata cucullata</i>
"	398 <i>Amaurodryas vittata</i>
"	404 <i>Ethelornis magnirostris cairnsensis</i>
"	436 <i>Rhipidura flabellifera victoriæ</i>
"	436 <i>Rhipidura flabellifera alisteri</i>
"	439 ^A <i>Howeavis rufifrons intermedia</i>
"	439 <i>Howeavis rufifrons rufifrons</i>
"	442 <i>Leucocircia tricolor tricolor</i>
"	444 <i>Myiagra rubecula ringwoodi</i>
"	446 <i>Myiagra nitida nitida</i>
"	443 <i>Sisura inquieta inquieta</i>
"	457 ^A <i>Coracina novæhollandiæ novæhollandiæ</i>
"	462 <i>Lalage tricolor tricolor</i>
"	479 <i>Morganornis superciliosus superciliosus</i>
"	482 <i>Calamanthus fuliginosus fuliginosus</i>
"	482 ^A <i>Calamanthus fuliginosus albiloris</i>
"	489 <i>Ephthianura albiloris albiloris</i>
"	494 <i>Conopodera australis australis</i>
"	512 <i>Acanthiza pusilla macularia</i>
"	519 <i>Sericornis longirostris longirostris</i>
"	519 <i>Sericornis longirostris harterti</i>
"	524 <i>Tasmanornis humilis humilis</i>
"	529 <i>Mahurus cyaneus fletcheræ</i>
"	542 <i>Ryania melanocephala melanocephala</i>
"	543 <i>Ryania melanocephala pyrrhonota</i>
"	545 <i>Stipiturus malachurus tregellasi</i>
"	559 <i>Artamus leucorhynchus leucopygialis</i>

* See list of birds breeding within 50 yards of Mr. White's office.

CUCKOO.	FOSTER-PARENT.
<i>Cuculus pallidus</i> (<i>Heteroscenes pallidus pallidus</i>), Pallid Cuckoo	560 <i>Campbellornis superciliosus superciliosus</i>
" "	561 <i>Campbellornis personatus munna</i>
" "	563 <i>Austrartamus melanops hypoleucus</i>
" "	564 <i>Pseudartamus cyanopterus</i>
" "	565 <i>Micrartamus minor minor</i>
" "	566 <i>Colluricincla harmonica harmonica</i>
" "	567 <i>Colluricincla harmonica strigata</i>
" "	574 <i>Bowyeria boweri</i>
" "	575 <i>Grallina cyanoleuca cyanoleuca</i>
" "	422 <i>Falcunculus frontatus frontatus</i>
" "	425 <i>Oreocia cristata cristata</i>
" "	428 <i>Pachycephala pectoralis queenslandica</i>
" "	428 <i>Pachycephala pectoralis pectoralis</i>
" "	428 <i>Pachycephala pectoralis youngi</i>
" "	429 <i>Pachycephala pectoralis glaucura</i>
" "	430 <i>Lewinornis rufiventris rufiventris</i>
" "	431 <i>Gilbertornis rufogularis rufogularis</i>
" "	433 <i>Timixos olivaceus olivaceus</i>
" "	418 <i>Eopsaltria australis australis</i>
" "	418 <i>Eopsaltria australis viridior</i>
" "	583 <i>Neositta chrysoptera chrysoptera</i>
" "	593 <i>Climacteris leucophæa leucophæa</i>
" "	613 <i>Melithreptus lunatus lunatus</i>
" "	616 <i>Melithreptus gularis loftyi</i>
" "	618 <i>Melithreptus validirostris</i>
" "	619 <i>Melithreptus atricapillus submagirostris</i>
" "	620 <i>Melithreptus affinis affinis</i>
" "	621 <i>Plectorhyncha lanceolata lanceolata</i>
" "	627 <i>Acanthorhynchus tenuirostris dubius</i>
" "	629 <i>Gliciphila melanops melanops</i>
" "	631 <i>Ramsayornis fasciatus inkermani</i>
" "	638 <i>Zanthomiza phrygia phrygia</i>
" "	643 <i>Paraptilotis fusca fusca</i>
" "	648 <i>Paraptilotis chrysops chrysops</i>
" "	644 <i>Meliphaga lewinii lewinii</i>
" "	646 <i>Meliphaga sonora walgetti</i>
" "	649 <i>Nesoptilotis flavicollis flavigula</i>
" "	651 <i>Nesoptilotis leucotis leucotis</i>
" "	651 <i>Nesoptilotis leucotis melanodera</i>
" "	652 <i>Lophoptilotis melanops melanops</i>
" "	653 <i>Lophoptilotis leadbeateri</i>
" "	656 <i>Lichenostomus ornatus taileni</i>
" "	661 <i>Ptilotula penicillata penicillata</i>
" "	660 <i>Broadbentia flava addenda</i>
" "	667 <i>Phylidonyris pyrrhoptera inornata</i>
" "	668 <i>Meliornis novæhollandiæ canescens</i>
" "	668 <i>Meliornis novæhollandiæ novæhollandiæ</i>
" "	668 <i>Meliornis novæhollandiæ assimilis</i>
" "	669 <i>Meliornis niger niger</i>
" "	671 <i>Manorina melanophrys yarra</i>
" "	672 <i>Myzantha melanocephala melanocephala</i>
" "	674 <i>Myzantha flavigula flavigula</i>
" "	675 <i>Coleia carunculata carunculata</i>
" "	677 <i>Anthochaera chrysoptera chrysoptera</i>
" "	679 <i>Acanthogenys rufogularis rufogularis</i>
" "	680 <i>Entomyzon cyanotis cyanotis</i>
" "	683 <i>Neophilemon buceroides buceroides</i>
" "	684 <i>Tropidorhynchus corniculatus corniculatus</i>

CUCKOO.	FOSTER-PARENT.
<i>Cuculus pallidus</i> (<i>Heteroscenes pallidus pallidus</i>), Pallid Cuckoo	687 <i>Anthus australis australis</i>
" " "	712 <i>Mimeta sagittata sagittata</i>
" " "	712A <i>Mimeta sagittata subaffinis</i>
" " "	714 <i>Sphecotheres maxillaris vieilloti</i>
" " "	716 <i>Dicruropsis bracteatus bracteatus</i>
<i>Cuculus pallidus</i> (<i>Heteroscenes pallidus occidentalis</i>).. ..	442 <i>Leucocirca tricolor picata</i>
" " "	462 <i>Lalage tricolor tricolor</i>
" " "	483B <i>Calamanthus campestris rubiginosus</i>
" " "	562A <i>Austrartamus melanops tregellasi</i>
" " "	50* <i>Austrartamus melanops venustus</i>
" " "	575 <i>Grallina cyanoleuca cyanoleuca</i>
" " "	61* <i>Meliphaga sonora forresti</i>
" " "	654 <i>Lichenostomus cratitius stirlingi</i>
" " "	655 <i>Lichenostomus heartlandi heartlandi</i>
" " "	656 <i>Lichenostomus ornatus ornatus</i>
" " "	673 <i>Myzantha flavigula obscura</i>
" " "	675 <i>Coleia carunculata woodwardi</i>
<i>Cacomantis flabelliformis</i> (<i>C. rubricatus rubricatus</i>), Fan-tailed Cuckoo	392 <i>Petroica multicolor frontalis</i>
" " "	394 <i>Whiteornis goodenovii quoyi</i>
" " "	398 <i>Amaurodryas vittata</i>
" " "	402 <i>Gerygone olivacea olivacea</i>
" " "	405 <i>Wilsonavis fusca fusca</i>
" " "	436 <i>Rhipidura flabellifera alisteri</i>
" " "	442 <i>Leucocirca tricolor tricolor</i>
" " "	462 <i>Lalage tricolor tricolor</i>
" " "	471 <i>Pycnoptilus floccosus sandlandi</i>
" " "	475 <i>Hylacola cauta brevicauda</i>
" " "	482 <i>Calamanthus fuliginosus fuliginosus</i>
" " "	489 <i>Epthianura albifrons albifrons</i>
" " "	500 <i>Origma solitaria</i>
" " "	501 <i>Chthonicola sagittata sagittata</i>
" " "	503 <i>Acanthiza nana mathewsi</i>
" " "	512 <i>Acanthiza pusilla macularia</i>
" " "	512 <i>Acanthiza pusilla pusilla</i>
" " "	512B <i>Acanthiza pusilla diemenensis</i>
" " "	508 <i>Geobasileus chrysorrhous sandlandi</i>
" " "	518 <i>Neosericornis lathamii lathamii</i>
" " "	519 <i>Sericornis longirostris longirostris</i>
" " "	521 <i>Sericornis magnirostris magnirostris</i>
" " "	524 <i>Tasmanornis humilis humilis</i>
" " "	530 <i>Malurus cyaneus australis</i>
" " "	530A <i>Malurus cyaneus cyanocephalus</i>
" " "	537 <i>Leggeornis lamberti lamberti</i>
" " "	542 <i>Ryania melanocephala melanocephala</i>
" " "	545 <i>Stipiturus malachurus tregellasi</i>
" " "	545 <i>Stipiturus malachurus malachurus</i>
" " "	555 <i>Mytila striata howei</i>
" " "	564 <i>Pseudartamus cyanopterus</i>
" " "	428 <i>Pachycephala pectoralis pectoralis</i>
" " "	429 <i>Pachycephala pectoralis glauca</i>
" " "	430 <i>Lewinornis rufiventris rufiventris</i>
" " "	418 <i>Eopsaltria australis viridior</i>
" " "	418 <i>Eopsaltria australis australis</i>

* Provisional List.

CUCKOO.	FOSTER-PARENT.
<i>Cacomantis flabelliformis</i> (<i>C. rubricatus rubricatus</i>), Fan-tailed Cuckoo	584 <i>Neositta leucocephala leucocephala</i>
" " "	613 <i>Melithreptus lunatus lunatus</i>
" " "	619 <i>Melithreptus atricapillus submagirostris</i>
" " "	644 <i>Meliphaga lewinii lewinii</i>
" " "	644 <i>Meliphaga lewinii mab</i>
" " "	648 <i>Paraptilotis chrysops beaconsfieldi</i>
" " "	648 <i>Paraptilotis chrysops chrysops</i>
" " "	649 <i>Nesoptilotis flavicollis flavigula</i>
" " "	651 <i>Nesoptilotis leucotis leucotis</i>
" " "	653 <i>Lophoptilotis leadbeateri</i>
" " "	661 <i>Ptilotula penicillata penicillata</i>
" " "	668 <i>Meliornis novæhollandiæ canescens</i>
<i>Cacomantis rubricatus athertoni</i> , Northern Fantail Cuckoo ..	602 <i>Austrodicæum hirundinaceum hirundinaceum</i>
" " "	631 <i>Ramsayornis fasciatus inkermani</i>
" " "	650 <i>Meliphaga fasciogularis fasciogularis</i>
<i>Cacomantis rubricatus albani</i> , Western Fantail Cuckoo ..	513 <i>Acanthiza pusilla apicalis</i>
" " "	656 <i>Lichenostomus ornatus munna</i>
<i>Cacomantis variolosus</i> (<i>C. pyrophanus variolosus</i>), Square-tailed Cuckoo ..	388 <i>Micræca fascians fascians</i>
" " "	392 <i>Petroica multicolor frontalis</i>
" " "	393 <i>Littleria chrysoptera phænicea</i>
" " "	396 <i>Belchera rosea</i>
" " "	394 <i>Whiteornis goodenovii alexandræ</i>
" " "	402 <i>Gerygone olivacea olivacea</i>
" " "	405 <i>Wilsonavis fusca fusca</i>
" " "	436 <i>Rhipidura flabellifera alisteri</i>
" " "	439 <i>Howeavis rufifrons rufifrons</i>
" " "	442 <i>Leucocirca tricolor tricolor</i>
" " "	444 <i>Myiagra rubecula rubecula</i>
" " "	455 <i>Monarcha melanopsis melanopsis</i>
" " "	519 <i>Sericornis longirostris longirostris</i>
" " "	530 <i>Malurus cyaneus australis</i>
" " "	537 <i>Leggeornis lamberti lamberti</i>
" " "	542 <i>Ryania melanocephala melanocephala</i>
" " "	428 <i>Pachycephala pectoralis pectoralis</i>
" " "	418 <i>Eopsaltria australis australis</i>
" " "	648 <i>Paraptilotis chrysops chrysops</i>
<i>Cacomantis pyrophanus dumetorum</i> , Western Square-tailed Cuckoo	437 <i>Rhipidura flabellifera subphasiana</i>
" " "	441 <i>Setosura setosa tormenti</i>
" " "	442 <i>Leucocirca tricolor picta</i>
" " "	445 <i>Myiagra rubecula broomei</i>
" " "	451 <i>Piezorhynchus alecto tormenti</i>
" " "	541 <i>Malurus coronatus macgillivrayi</i>
" " "	557 <i>Amytornis woodwardi</i>
" " "	631 <i>Ramsayornis fasciatus broomei</i>
" " "	631 <i>Ramsayornis fasciatus fasciatus</i>
" " "	635 <i>Conopophila rufogularis queenslandica</i>
" " "	659 <i>Ptilotula flavescens wyndhami</i>

CUCKOO.	FOSTER-PARENT.
<i>Cacomantis pyrrhophanus westwoodia</i> , Northern Square-tailed Cuckoo	391 <i>Kempia flavigaster terrareginæ</i>
" " " " " " " "	439A <i>Howeavis rufifrons intermedia</i>
" " " " " " " "	44* <i>Acanthiza pusilla katherina</i>
" " " " " " " "	521 <i>Sericornis magnirostris viridior</i>
" " " " " " " "	543 <i>Ryania melanocephala pyrrhonota</i>
" " " " " " " "	583 <i>Neositta chrysoptera chrysoptera</i>
" " " " " " " "	631 <i>Ramsayornis fasciatus inkermani</i>
" " " " " " " "	632 <i>Ramsayornis modestus ramsayi</i>
" " " " " " " "	660 <i>Broadbentia flava addenda</i>

COMBINATION CUCKOO CLUTCHES.

<i>Cacomantis rubricatus rubricatus</i>	{	511 <i>Acanthiza lineata chandleri</i>
<i>Neochalcites basalis mellori</i>		
<i>Cacomantis rubricatus rubricatus</i>	{	542 <i>Ryania melanocephala melanocephala</i>
<i>Cacomantis pyrrhophanus variolosus</i>		
<i>Cacomantis castaneiventris</i> (<i>C. castaneiventris</i>), Chestnut-breasted Cuckoo		521 <i>Sericornis magnirostris viridior</i>
" " " " " " " "		711 <i>Neochmia phaeton phaeton</i>
<i>Mesocallius osculans</i> (<i>Owenavis osculans osculans</i>), Black-eared Cuckoo		518 <i>Neosericornis lathamii lathamii</i>
" " " " " " " "		501 <i>Chthonicola sagittata sagittata</i>
<i>Owenavis osculans rogersi</i> , Western Black-eared Cuckoo		517 <i>Pyrrholaemus brunneus pallescens</i>
<i>Chalcococcyx basalis</i> (<i>Neochalcites basalis mellori</i>), Narrow-billed Bronze-Cuckoo		392 <i>Petroica multicolor frontalis</i>
" " " " " " " "		393 <i>Littleria chrysoptera phœnicea</i>
" " " " " " " "		436A <i>Rhipidura flabellifera albiscapa</i>
" " " " " " " "		439 <i>Howeavis rufifrons inexpectata</i>
" " " " " " " "		446 <i>Myiagra nitida nitida</i>
" " " " " " " "		475 <i>Hylacola cauta brevicauda</i>
" " " " " " " "		482 <i>Calamanthus fuliginosus diemenensis</i>
" " " " " " " "		482A <i>Calamanthus fuliginosus albiloris</i>
" " " " " " " "		489 <i>Epthianura albifrons albifrons</i>
" " " " " " " "		491 <i>Aurepthianura aurifrons aurifrons</i>
" " " " " " " "		512 <i>Acanthiza pusilla macularia</i>
" " " " " " " "		515 <i>Acanthiza ewingii ewingii</i>
" " " " " " " "		529 <i>Malurus cyaneus fletcheræ</i>
" " " " " " " "		532 <i>Malurus melanotus melanotus</i>
" " " " " " " "		545 <i>Stipiturus malachurus tregellasi</i>
" " " " " " " "		620 <i>Melithreptus affinis affinis</i>
" " " " " " " "		656 <i>Lichenostomus ornatus taileni</i>
" " " " " " " "		630 <i>Gliciphila albifrons incerta</i>
" " " " " " " "		667 <i>Phylidonyris pyrrhoptera inornata</i>

* Provisional List.

CUCKOO.	FOSTER-PARENT.
<i>Neochalcites basalis modestus</i> , Northern Narrow-billed Bronze-Cuckoo	388 <i>Micræca fascians fascians</i>
" " "	394 <i>Whiteornis goodenovii quoyi</i>
" " "	400 <i>Smicromis brevirostris brevirostris</i>
" " "	402 <i>Gerygone olivacea olivacea</i>
" " "	405 <i>Wilsonavis fusca fusca</i>
" " "	436 <i>Rhipidura flabellifera harterti</i>
" " "	436 <i>Rhipidura flabellifera alisteri</i>
" " "	439 <i>Howeavis rufifrons rufifrons</i>
" " "	442 <i>Leucocirca tricolor tricolor</i>
" " "	443 <i>Seisura inquieta inquieta</i>
" " "	489 <i>Epthianura albifrons albifrons</i>
" " "	490 <i>Parepthianura tricolor tricolor</i>
" " "	495 <i>Cisticola exilis exilis</i>
" " "	501 <i>Chthonicola sagittata sagittata</i>
" " "	503 <i>Acanthiza nana nana</i>
" " "	512 <i>Acanthiza pusilla hamiltoni</i>
" " "	511 <i>Acanthiza lineata goulburni</i>
" " "	509 <i>Acanthiza uropygialis uropygialis</i>
" " "	508 <i>Geobasileus chrysorrhous chrysorrhous</i>
" " "	507 <i>Geobasileus reguloides reguloides</i>
" " "	518 <i>Neosericornis lathamii lathamii</i>
" " "	521 <i>Sericornis magnirostris magnirostris</i>
" " "	530 <i>Malurus cyaneus australis</i>
" " "	530A <i>Malurus cyaneus cyanochlamys</i>
" " "	355 <i>Hallornis cyanotus cyanotus</i>
" " "	537 <i>Leggeornis lamberti lamberti</i>
" " "	578 <i>Aphelocephala leucopsis leucopsis</i>
" " "	583 <i>Neositta chrysoptera chrysoptera</i>
" " "	599 <i>Zosterops lateralis lateralis</i>
" " "	602 <i>Austrodicæum hirundinaceum hirundinaceum</i>
" " "	622 <i>Myzomela sanguinolenta sanguinolenta</i>
" " "	624 <i>Cissomela nigra ashbyi</i>
" " "	627 <i>Acanthorhynchus tenuirostris tenuirostris</i>
" " "	629 <i>Gliciphila melanops melanops</i>
" " "	643 <i>Paraptilotis fusca fusca</i>
" " "	648 <i>Paraptilotis chrysops chrysops</i>
" " "	651 <i>Nesoptilotis leucotis leucotis</i>
" " "	661 <i>Ptilotula penicillata penicillata</i>
" " "	668 <i>Meliornis novæhollandiæ novæhollandiæ</i>
" " "	669 <i>Meliornis niger niger</i>
" " "	696 <i>Tæniopygia castanotis mouki</i>
" " "	703 <i>Ægintha temporalis temporalis</i>
" " "	706 <i>Alisteranus cinctus vinotinctus</i>
<i>Neochalcites basalis wyndhami</i> , Western Narrow-billed Bronze-Cuckoo	28 <i>Stictopeleia cuneata mungi</i>
" " "	407 <i>Wilsonavis lævigaster lævigaster</i>
" " "	513 <i>Acanthiza pusilla apicalis</i>
" " "	510 <i>Milligania robustirostris</i>
" " "	534 <i>Malurus splendens splendens</i>
" " "	535 <i>Hallornis cyanotus exsul</i>
" " "	537 <i>Leggeornis lamberti mungi</i>
" " "	537 <i>Leggeornis lamberti occidentalis</i>
" " "	539A <i>Leggeornis amabilis dulcis</i>
" " "	543 <i>Ryania melanocephala cruentata</i>
" " "	596 <i>Zosterops gouldi</i>

Cuckoo.	FOSTER-PARENT.
<i>Neochalcites basalis wyndhami</i> , Western Narrow-billed Bronze-Cuckoo	628 <i>Acanthorhynchus superciliosus wilsoni</i>
" " " "	629 <i>Gliciphila melanops westernensis</i>
" " " "	639 <i>Stigmatops indistincta indistincta</i>
" " " "	656 <i>Lichenostomus ornatus ornatus</i>
" " " "	668A <i>Meliornis novæhollandiæ longirostris</i>
<i>Chalcococcyx russata</i> (<i>Neochal-</i> <i>cites russatus</i>), Rufous- throated Bronze-Cuckoo	404 <i>Ethelornis magnirostris cairnsensis</i>
" " " "	— <i>Pseudogerygone brunneipectus</i>
" " " "	410 <i>Pseudogerygone personata personata</i>
" " " "	411 <i>Heteromyias cinereifrons</i>
" " " "	441 <i>Setosura setosa superciliosa</i>
" " " "	543 <i>Ryania melanocephala pyrrhonota</i>
" " " "	612 <i>Cyrtostomus frenatus australis</i>
" " " "	631 <i>Ramsayornis fasciatus inkermani</i>
" " " "	644 <i>Meliphaga lewinii iwi</i>
" " " "	650 <i>Meliphaga fasciocularis fasciocularis</i>
" " " "	660 <i>Broadbentia flava addenda</i>
<i>Chalcococcyx lucidus</i> (<i>Lampro-</i> <i>coccyx lucidus</i>), Broad-billed Bronze-Cuckoo	515 <i>Acanthiza ewingii ewingii</i>
<i>Chalcococcyx plagosus</i> (<i>Lampro-</i> <i>coccyx plagosus plagosus</i>), Bronze-Cuckoo	386 <i>Hylochelidon nigricans caleyi</i>
" " " "	388 <i>Micræa fascians fascians</i>
" " " "	388 <i>Micræa fascians howei</i>
" " " "	392 <i>Petroica multicolor frontalis</i>
" " " "	393 <i>Littlera chrysoptera addenda</i>
" " " "	394 <i>Whiteornis goodenovii quoyi</i>
" " " "	397 <i>Melanodryas cucullata cucullata</i>
" " " "	400 <i>Smicromis brevirostris brevirostris</i>
" " " "	402 <i>Gerygone olivacea olivacea</i>
" " " "	404 <i>Ethelornis magnirostris cairnsensis</i>
" " " "	405 <i>Wilsonavis fusca fusca</i>
" " " "	407 <i>Wilsonavis lævigaster mouki</i>
" " " "	410 <i>Pseudogerygone personata flavida</i>
" " " "	411 <i>Heteromyias cinereifrons</i>
" " " "	436 <i>Rhipidura flabellifera alisteri</i>
" " " "	442 <i>Leucocircia tricolor tricolor</i>
" " " "	444 <i>Myiagra rubecula rubecula</i>
" " " "	453A <i>Symposiachrus trivirgatus albiventris</i>
" " " "	462 <i>Lalage tricolor tricolor</i>
" " " "	489 <i>Epthianura albifrons albifrons</i>
" " " "	490 <i>Parepthianura tricolor tricolor</i>
" " " "	491 <i>Aurepthianura aurifrons aurifrons</i>
" " " "	494 <i>Conopodera australis inexpectatus</i>
" " " "	495 <i>Cisticola exilis exilis</i>
" " " "	501 <i>Chthonicola sagittata sagittata</i>
" " " "	503 <i>Acanthiza nana nana</i>
" " " "	512 <i>Acanthiza pusilla pusilla</i>
" " " "	511 <i>Acanthiza lineata goulburni</i>
" " " "	508 <i>Geobasileus chrysorrhous chrysorrhous</i>
" " " "	508 <i>Geobasileus chrysorrhous sandlandi</i>
" " " "	507 <i>Geobasileus reguloides reguloides</i>
" " " "	507 <i>Geobasileus reguloides connectens</i>
" " " "	518 <i>Neosericornis lathami lathami</i>
" " " "	521 <i>Sericornis magnirostris magnirostris</i>
" " " "	530 <i>Malurus cyaneus australis</i>

CUCKOO.	FOSTER-PARENT.
<i>Chalcococcyx plagosus</i> (<i>Lamprococcyx plagosus plagosus</i>), Bronze-Cuckoo	535 <i>Hallorinis cyanotus cyanotus</i>
" " " "	542 <i>Ryania melanocephala melanocephala</i>
" " " "	543 <i>Ryania melanocephala pyrrhonoia</i>
" " " "	561 <i>Campbellornis personatus munna</i>
" " " "	562A <i>Australoramphus melanops melanops</i>
" " " "	566 <i>Colluricincla harmonica pallescens</i>
" " " "	418 <i>Eopsaltria australis australis</i>
" " " "	583 <i>Neositta chrysoptera chrysoptera</i>
" " " "	599 <i>Zosterops lateralis lateralis</i>
" " " "	612 <i>Cyrtostomus frenatus australis</i>
" " " "	619 <i>Melithreptus atricapillus submagnirostris</i>
" " " "	624 <i>Cissomela nigra ashbyi</i>
" " " "	627 <i>Acanthorhynchus tenuirostris tenuirostris</i>
" " " "	629 <i>Gliciphila melanops chandleri</i>
" " " "	648 <i>Paraptilotis chrysops chrysops</i>
" " " "	651 <i>Nesoptilotis leucotis leucotis</i>
" " " "	653 <i>Lophoptilotis leadbeateri</i>
" " " "	656 <i>Lichenostomus ornatus taileni</i>
" " " "	661 <i>Ptilotula penicillata penicillata</i>
" " " "	668 <i>Meliornis novæhollandiæ novæhollandiæ</i>
" " " "	703 <i>Ægithya temporalis temporalis</i>
" " " "	711 <i>Neochmia phaeton iredalei</i>
<i>Lamprococcyx plagosus tasmanicus</i> (Tasmanian Bronze-Cuckoo)	384 <i>Hirundo neoxena neoxena</i>
" " " "	395 <i>Erythrodryas rodinogaster rodinogaster</i>
" " " "	398 <i>Amaurodryas vittata</i>
" " " "	436A <i>Rhipidura flabellifera albiscapa</i>
" " " "	446 <i>Myiagra nitida nitida</i>
" " " "	512B <i>Acanthiza pusilla diemenensis</i>
" " " "	515 <i>Acanthiza ewingii ewingii</i>
" " " "	528 <i>Acanthornis magnus</i>
<i>Lamprococcyx plagosus carteri</i> (Western Bronze-Cuckoo)	400 <i>Smicrornis brevirostris stirlingi</i>
" " " "	403 <i>Ethelornis culicivorus culicivorus</i>
" " " "	483B <i>Calamanthus campestris rubiginosus</i>
" " " "	513 <i>Acanthiza pusilla apicalis</i>
" " " "	504 <i>Acanthiza inornata inornata</i>
" " " "	504A <i>Acanthiza inornata mastersi</i>
" " " "	508 <i>Geobasileus chrysorrhous multi</i>
" " " "	508A <i>Geobasileus chrysorrhous pallidus</i>
" " " "	596 <i>Zosterops gouldi</i>
" " " "	656 <i>Lichenostomus ornatus wesleydalei</i>
" " " "	668A <i>Meliornis novæhollandiæ longirostris</i>
<i>Chalcococcyx minutillus</i> (<i>Lamprococcyx minutillus minutillus</i>), Little Bronze-Cuckoo	402 (sub-sp. of). <i>Gerygone olivacea flavigasta</i>
<i>Lamprococcyx minutillus perplexus</i> (Western Little Bronze-Cuckoo)	402 (sub-sp. of). <i>Gerygone olivacea rogersi</i>
" " " "	631 <i>Ramsayornis fasciatus broomei</i>

COMBINATION CUCKOO CLUTCHES.

<i>Lamprococcyx plagosus plagosus</i>	}	503 <i>Acanthiza nana nana</i>
<i>Neochalcites basalis modestus</i> ..		
<i>Lamprococcyx plagosus plagosus</i>	}	507 <i>Geobasileus reguloides reguloides</i>
<i>Neochalcites basalis modestus</i> ..		
<i>Lamprococcyx plagosus plagosus</i>	}	606 <i>Pardalotus punctatus punctatus</i>
<i>Neochalcites basalis modestus</i> ..		

CUCKOO.	FOSTER-PARENT.
<i>Chalcococcyx barnardi</i> (<i>Neochalcites barnardi</i>), Allied Bronze-Cuckoo	542 <i>Ryania melanocephala melanocephala</i> 697 <i>Stizoptera bichenovii bichenovii</i> 696 <i>Taniopygia castanotis mouki</i>
<i>Eudynamys cyanocephala</i> (<i>Eudynamys orientalis cyanocephalus</i>), Koel	684 <i>Tropidorhynchus corniculatus corniculatus</i> 685 <i>Microphilemon orientalis orientalis</i> 712 <i>Mimeta sagittata sagittata</i>
<i>Eudynamys orientalis flindersii</i> , Northern Koel	566 <i>Colluricincla harmonica pallescens</i> 575 <i>Grallina cyanoleuca cyanoleuca</i> 740A <i>Melloria quoyi rufescens</i> 680 <i>Entomyzon cyanotis connectens</i> 64* <i>Entomyzon cyanotis harterti</i> 682 <i>Philemon argenticeps kempfi</i> 683 <i>Neophilemon buceroides buceroides</i> 684 <i>Tropidorhynchus corniculatus ellioti</i> 685 <i>Microphilemon orientalis johnstoni</i> 712A <i>Mimeta sagittata subaffinis</i> 715 <i>Sphecotheres flaviventris flaviventris</i> 716 <i>Dicruropsis bracteatus bracteatus</i> 729 <i>Philoris paradisea victoriae</i>
<i>Eudynamys orientalis sub-cyanocephalus</i> (Western Koel)	575 <i>Grallina cyanoleuca neglecta</i> 685A <i>Microphilemon orientalis sordidus</i>
<i>Scythrops novæ-hollandiæ</i> (<i>Scythrops novæhollandiæ novæ-hollandiæ</i>), Channelbill	240 <i>Accipiter cirrocephalus cirrocephalus</i> 747 <i>Gymnorhina tibicen tibicen</i> 732 <i>Corvus ceciliæ queenslandicus</i> 735 <i>Strepera graculina graculina</i>

* Provisional List.

Notes upon *Astur cruentus* (*Urospiza fasciata cruenta*).

By H. L. WHITE, R.A.O.U. (SCONE, N.S.W.)

A CONSIDERABLE amount of uncertainty has always existed with regard to this bird, and Mr. A. J. North's note * in "Nests and Eggs of Birds Found Breeding in Australia and Tasmania" still further confuses matters.

During Mr. G. M. Mathews's visit to Australia he spent several days with me, examining all my specimens most carefully. Concerning *Urospiza fasciata cruenta*, he postponed giving a final

* "Nests and Eggs," vol. iii., p. 194.

opinion until he handled Gould's type-skin in the Philadelphia Museum. He now writes from England to the effect that he has examined the type-skin, and finds it to be the common bird of Western Australia, and not the rare bird mentioned by Mr. North, as referred to above. Skins forwarded to me by Mr. H. G. Barnard from the Macarthur River, Northern Territory, were identified by Mr. Mathews as *Urospiza fasciata didima* (Mathews). These same skins, upon comparison with those mentioned by Mr. North and in the Australian Museum, are found to be slightly different; it is evident, therefore, that if Mr. North's bird is neither *U. f. didima* nor *U. f. cruenta* it must be either a freak or a new sub-species.

I am unable to say whether *Urospiza fasciata didima* is uncommon throughout the whole of North Australia, but the birds are fairly plentiful on the Macarthur River, where Mr. H. G. Barnard secured several skins and clutches of eggs; one of the latter I claim to be the type, and describe it elsewhere in the present issue of *The Emu*. It is now evident that Mr. Mathews, in his latest list (1913) has placed the distribution of the species correctly as follows:—

Urospiza fasciata fasciata.—Eastern Australia.

Urospiza fasciata cruenta.—Western Australia.

Urospiza fasciata didima.—Northern Territory and North-West Australia.

Unfortunately, I have not the measurements of a female specimen of Mr. North's rare bird, but the undermentioned measurements of male skins of the species may be of interest:—

	LENGTH IN MILLIMETRES.				
	Total Length.	Wing.	Tail.	Tarsus.	Culmen.
<i>Urospiza fasciata didima</i> , collected by H. G. Barnard at Macarthur River, Northern Territory	381	248	191	70	19
Australian Museum specimen, labelled <i>Astur cruentus</i> , recorded as from Derby, Western Australia (North-West), about 17° S.	393	267	216	74	23
Australian Museum specimen, labelled <i>Astur approximans</i> , recorded as from Yane Creek, 100 miles from Port Darwin	388	248	191	67	23
A typical skin of <i>Astur approximans</i> , according to A. J. North, vol. iii., p. 190, "Nests and Eggs"	419	258	212	80	26

The above, taken in conjunction with the following measurements of female specimens, should, I think, go a long way towards proving Mr. Mathews's contention to be correct:—

Species.	Collector.	Locality.	MEASUREMENTS IN MILLIMETRES.					Remarks.
			Length.	Wing.	Tail.	Tarsus.	Culmen.	
<i>U. f. didima</i>	G. F. Hill	Parry Harbour, North-West Australia, about 14° S. ..	430	275	225	78	27	Not fully adult.
<i>U. f. didima</i>	G. F. Hill	Napier Broome Bay, North-West Australia, about 14° S. ..	442	280	230	78	27	Not fully adult.
<i>U. f. didima</i>	G. F. Hill	Napier Broome Bay, North-West Australia ..	465	285	240	80	28	A very old bird, with exceedingly dark plumage
<i>U. f. didima</i>	H. G. Barnard	Macarthur River, Gulf of Carpentaria, Northern Territory, about 16° S. ..	460	280	225	78	25	Fully adult, breeding.
<i>U. f. cruenta</i>	F. L. Whitlock	Nullagine, Pilbarra gold-field, W.A., about 22° S. ..	485	300	245	80	25	Fully adult, breeding.
<i>U. f. cruenta</i>	F. L. Whitlock	Wilson's Inlet, near Albany, W.A. ..	483	295	245	76	28	Fully adult, breeding.
<i>U. f. fasciata</i>	A typical Eastern North, vol. iii.,	specimen, according to A. J. p. 190, "Nests and Eggs" ..	491	309	254	82	30	My specimens are all slightly larger.

Descriptions of New Australian Birds' Eggs.

By H. L. WHITE, R.A.O.U. (SCONE, N.S.W.)

ASTUR (?) (*Urospiza fasciata didima*, Mathews), Northern Goshawk.

Nest a large structure of sticks and small branches, lined with leaves, placed high up in a swamp gum (*Eucalyptus*) tree.

Eggs three, roundish-oval in shape; texture of shell coarse, without gloss; colour chalky bluish-white (green inside). One specimen (a) is sparingly marked all over with large reddish-purple blotches; a second (b) has a few irregular-shaped markings, including short lines, of the same colour; while the third (c) specimen has no markings. Measurements:—(a) 1.67 x 1.38, (b) 1.6 x 1.42, (c) 1.55 x 1.33.

Taken by H. G. Barnard, 28/10/13, near Borroloola, Macarthur River, Northern Territory. Parent birds identified by Mr. G. M. Mathews.

A second clutch, taken in the same locality by the same collector, is more uniform in colour (one specimen only being marked with a few short lines) and larger, measurements being—(a) 1.78 x 1.45, (b) 1.81 x 1.37, (c) 1.75 x 1.44.

AMYTORNIS WHITEI (*Mytisa striata whitei*), Mathews.

Securing a clutch of *Amytornis* eggs is always a very welcome event in the life of an Australian oologist. I have been particularly fortunate in this respect, and now possess a very fair series of these rare eggs. My latest addition is a clutch of the above-named species from Nullagine, Pilbarra goldfield, Western Australia, taken by Mr. F. Lawson Whitlock.

The nest was cup-shaped, composed of dead spinifex leaves, and lined with kangaroo fur, the walls of the nest being thin and much interwoven with growing spinifex. Inside measurements, $2\frac{1}{2}$ inches wide by $1\frac{1}{2}$ inches deep. Situation, a natural cavity in a clump of spinifex growing on the side of a small gully. Size of clump, 3 feet in diameter by 30 inches in height.

Eggs, two, stout oval in shape, shell smooth and without gloss; colour white, marked all over, but particularly at the larger end, with small irregular-shaped brownish-red dots and splashes. Measurements—(a) .87 x .64, (b) .84 x .64.

MALURUS DULCIS (*Leggeornis amabilis dulcis*).

In *The Emu* * I described a clutch of three eggs said to be those of the above species. I now wish to alter the identification, verified by Mr. G. M. Mathews, to that of *Leggeornis amabilis rogersi*. The skins and eggs referred to were taken by Mr. G. F. Hill in North-West Australia. Skins (again identified by Mr. Mathews) and eggs of the true *Leggeornis amabilis dulcis* have now been received from Mr. H. G. Barnard, descriptions of the nest and eggs being as follow:—

Nest, a small dome-shaped structure composed of soft dead

* *Emu*, vol. x., p. 133.

grass, and placed in a bunch of spinifex (*Triodia*) growing in rough sandstone country. Outside measurement, 120 mm. x 90 mm.

Eggs, four in number, rather elongated oval in shape; texture of shell smooth, with a little gloss; colour white, with small reddish-brown markings distributed plentifully all over the surface. Measurements in inches:—(a) .61 x .44, (b) .6 x .44, (c) .59 x .42, (d) .59 x .42.

A second clutch contains four eggs, each of which is different in size, shape, and colour, the colour varying from heavy blotches of reddish-brown at the larger end to pure white. In a third clutch, of three eggs, the markings are confined to the larger end, while the eggs are slightly pyriform in shape.

Type clutch taken by H. G. Barnard, 8th January, 1914; locality, Borroloola, Macarthur River, south-west of Gulf of Carpentaria, Northern Territory.

The Young of *Climacteris leucophæa*.

BY J. W. MELLOR.

THE young of the White-throated Tree-creeper is not generally known, and even in the early days of ornithology it was mistaken by the noted ornithologist, the late John Gould, for a distinct species; this was rectified later by Mr. A. J. North. Some controversy arose amongst ornithologists at the last R.A.O.U. expedition relative to this bird. A description of the young female from specimens procured by me at Mallacoota, Victoria, during the fourteenth congress expedition of the R.A.O.U. would probably be helpful to ornithology. A notable feature, and one that strikes the observer instantly, is the large patch of bright rufous-brown which extends from a quarter way up the back right down the tail coverts, and forms a conspicuous rufous rump; this is noticeable even in the nestlings, but, I believe, is only found in the young females, for such is my experience with a number of specimens handled. This rufous rump lessens in size and intensity as the bird matures, until it finally disappears, giving place to the slaty-grey colour of the old bird. From specimens now before me I find that the process of changing does not come about by moulting, but by a fading away of the rusty colour and a gradual predominance of the slaty-grey colouration. A bright rusty-brown of the same hue appears just below the ear coverts, and is maintained by the adult female throughout life. The head, neck, and back are of a blackish-brown colour, each feather on the head being narrowly tipped with brown. Those of the mantle have a brownish tip followed by a brownish-black band, and then more brown colouring, giving the bird a somewhat indistinct, freckled appearance. The ear coverts are somewhat coarse and hairy, being blackish-brown with a light brown stripe down the centre of each. The wings are of greyish-brown appearance when closed, the primaries being brownish-black,

with a tinge of grey on the outer webs; the secondaries are also brownish-black tipped with slaty-grey, the greater wing coverts being of the latter colour. The primaries and secondaries have a bar of very pale rufous-brown crossing them midway, and appearing as a patch, which is conspicuous when the bird has its wings expanded in flight. The tail is slaty-grey, the two central feathers being wholly of that colour, while the others are more or less crossed by a broad band of jet black, leaving the tips and



Young White-throated Tree-creeper.

FROM A PHOTO. BY A. H. E. MATTINGLEY.

bases slaty-grey. The tips have a touch of white on the inner webs, this being more pronounced on the two outer feathers. The under tail coverts are pale whitish-cream, with several spots of black on either side of the feathers, giving them a barred and mottled appearance. The under surface is white on the throat, going into cream on the chest, darkening into dark cream or pale brown down the centre to the abdomen, while the flanks are

blackish-brown, each feather having a stripe of pale cream down the centre. The feathers have a softer and more silky appearance than in the adult bird, and also are lighter on the whole beneath than the full-plumaged female. Iris brown; bill horn; feet light horn.

Cuckoos and their Offspring.

BY S. A. HANSCOMBE, R.A.O.U. (SEAHAM, N.S.W.)

ON 28th October, after many days' observations, I succeeded in locating a well-hidden nest of a pair of Buff-tailed Tit-Warblers (*Acanthiza reguloides*). They had successfully eluded me for some days, though I was aware that they had completed their nest. Profiting by earlier experiences, I engaged in observations in the early morning, and found the nest. Many times I had rested beside it. It was safely hidden on the top rail of a paling fence, the paling and the rail holding it securely from wind or weather, while, overhanging the whole, was a large chaff-bag closely fitting over the paling and sapling. The fence was part of the remains of a deserted bush home, and here the old bag had hung for many months.

The opening to the nest was very small, but on inspection one egg was to be seen. On the evening of 29th another egg was there, and on the 30th the nest also held an egg of the Bronze-Cuckoo (*Chalcococcyx plagosus*). There were now certainly only two eggs of *A. reguloides*, and no evidence of any egg having been displaced, but this could have happened, as a colony of ants, a few feet distant, could readily account for the destruction of eggs ejected from the nest.

From further observations I concluded that the parent birds were at work incubating. On 13th November the egg of the intruder had hatched, and the little naked bird was a ball of activity. On the 14th November the other two eggs were still unhatched, but on the 15th both had disappeared. I could see no trace of shell and none of young birds, save the rapidly improving *C. plagosus*. Whether, in its blind twistings and rollings about for food, the latter had ejected either two eggs or two nestlings, I cannot say. Probably the eggs were ejected as "addled" specimens by the birds themselves, as to me it appeared too difficult a task for the young bird to perform. The position of the entrance to the nest leads me to this conclusion. The young Cuckoo grew very rapidly. Two adult Bronze-Cuckoos were always in the immediate neighbourhood, though they certainly never took part in supplying food to the fledgeling. The Tit-Warblers fed the alien with great care and attention till about 9 a.m., when visits slackened, to be renewed again at about 2 p.m., and continue well on to 5 p.m. In ten days the bird had grown wonderfully, and was well plumed, when an accident

put a sudden stop to my observations. Young bird and nest were carried off by some intruder, and, judging by the marks and scratchings, I would say that it was a wild cat.

This incident I much regretted, as I was desirous of observing whether the adult Cuckoos would, after a time, claim the young bird and prepare it for the migratory flight. I might add that since the 25th November, when the nest was destroyed, I have not seen either of the birds.

It fell to my share some years ago, at Belltrees, to watch a similar case in regard to the Pallid Cuckoo (*Cuculus pallidus*). The parent birds did certainly claim the young bird after it was well able to fly, and daily thereafter assisted the foster-parents to feed it.

Cuckoos—Ejection of Foster-Parents' Chicks.

BY A. G. CAMPBELL (KILSYTH, VIC.)

I HAVE been privileged to have under observation in the Kilsyth district (Vic.) two nests containing Cuckoos' eggs, and to see the ejection of the eggs or nestlings by the young Cuckoo.

In the first week in September, 1913, a nest of the Scarlet-breasted Robin (*Petroica leggii*) was discovered, situated in a pear-tree. It contained two eggs of the Robin and one egg of the Fan-tailed Cuckoo (*Cacomantis flabelliformis*). One morning the Cuckoo was found hatched, and on the ground beneath the nest lay a dead nestling of the Robin and an egg. Though the exact time of the Cuckoo hatching was not determined by a close watch, yet it was clearly in advance of the Robin's chicks. It appeared to be about 48 hours old when first seen. When the egg and dead Robin nestling were returned to the nest the young Cuckoo immediately proceeded to its tactics, and in the space of about a minute and a half had hoisted them over the side. This was repeated again and again until, at the end of five minutes, the Cuckoo gave up, either in disgust or exhaustion. The procedure was the same in each instance. The young Cuckoo edged round with its back to the object, and, by a wriggling motion, got its merithorp underneath, hoisting the unfortunate nest-mate on its back, where it was held in the cavity, supported by the shoulders on two sides and the merithorp on the third. The next move was for the Cuckoo to raise itself on its legs against the side of the nest, using its beak as a prop in the bottom; its wings, circling backward like arms, clasped the sides of the nest to assist in the leverage. The bird's body gradually rose to the level of the rim of the nest, and its burden was cast over.

This was a most uncanny display of instinct in a blind, naked, and seemingly helpless nestling. To make sure that its evil work was complete, the Cuckoo invariably paused for several seconds in the final position, though in apparent danger of toppling out backward itself, its "arms" firmly clutching the rim of the nest

and its head and neck thrust well forward to preserve the balance. Small sticks, bits of earth, and tiny apples put in the nest were as summarily ejected when the Cuckoo had recovered from its first exertions. The next day, the bird having grown considerably and the primary quills beginning to sprout, it was not sensitive to any strange objects put into the nest.

Another opportunity came of observing the same process in December, 1914, when a nest of the Wattle-Bird (*Anthochaera carunculata*) was found, containing one egg of the Honey-eater with one egg of the Pallid Cuckoo (*Cuculus pallidus*). The Cuckoo hatched during the early morning of the 6th, 40 hours before the young Wattle-Bird appeared from its shell. The young parasite was sensitive the first day. The touch of a straw caused it to wriggle like a wrestler for "a position," but it was evident that to shoulder the large egg was at present beyond its powers. The next day passed. The Cuckoo, being constantly supplied with food, rapidly gained weight until that evening, when the Wattle-Bird hatched; the nestlings were similar in size. On the 8th the Cuckoo was getting ready for action; a touch with the finger or a vibration of the nest would cause it to try a "hold." Several times it got the young Wattle-Bird squarely on its back, but, beyond raising its burden and propping itself well against the side of the nest, it appeared incapable of anything. The missing factor seemed to be in the failure of a grip for the wings. These would circle right and left in endeavouring to seize the side of the nest for a purchase. But, as the nest measured 4 inches across at its widest part, and the bird was only $2\frac{3}{8}$ inches from tip to tip, the proposition was, as yet, too much.

On the 9th the Cuckoo was in action many times. It could raise its victim half-way to the top and get a grip of the side of the nest with one "arm" at a time, but not with both together. Every movement of the young Wattle-Bird for every time the old birds came with food was a signal for a fresh attempt. Plainly, I thought, the game was up. The Wattle-Bird was growing rapidly, and, from its distended abdomen, seemed to be getting more attention than the Cuckoo. It was now about half an ounce the heavier of the two, besides which it could sometimes fend for itself and wriggle out of the hold of its adversary. It certainly looked as if both would have to live together and put up with each other's company. The nest being fully $2\frac{1}{2}$ inches deep and the edge being a broad platform of twigs, an inch in width, sloping inwards and not outwards, the whole surroundings were such that it seemed an impossibility for the Cuckoo to eject its companion. By the evening of the 11th, however, the deed was done, and the chick of the rightful owner lay dead beneath the nest.

These opportunities corroborate some remarks I have made previously in *The Emu* * on "Observations on the Rearing of a

* *Emu*, vol. vi., pp. 120-126.

Cuckoo." I have little further to add beyond drawing attention to the adaptation of the wings of the young Cuckoo to its fell purpose. The wings, weak and pliant in most nestlings, are here strong and powerful, and furnished with a hard, bony, thorn-like tip, which is curved forward, like a lumper's bill-hook, to assist it to engage and grip the side of the nest during the lifting process.

North Queensland Birds.

BY D. LE SOUËF, C.M.Z.S., M.B.O.U. (MELBOURNE).

I LEFT Melbourne for Sydney on the same day as the British Association for the Advancement of Science party, and was able to attend the Science meetings in that city, where many most interesting papers were read. I proceeded to Brisbane by steamer, and while there stayed with Dr. Hamlyn Harris. The Museum, under his control, has been very greatly improved, and the group cases of both animals and birds, with painted backgrounds, are very realistic, and do the Director and his officers credit. Some of the new cases, with birds and their nests and eggs, are also good. The old bird-cages in the Botanical Gardens have all been removed—a much-needed improvement.

Leaving Brisbane, I had a rough trip to Townsville. We passed through the beautiful Whitsunday Passage *en route*, and arrived at daylight. During the day I was enabled to visit both Mr. T. A. Gulliver and his brother, Mr. Ben. Gulliver, at Acacia Vale. I was surprised to see numbers of Bee-eaters (*Merops ornatus*), and soon noticed what attracted them. There were about twenty bee-hives. As the unfortunate bees returned, laden with honey, many were promptly seized by the birds, which were waiting for them on the branches of a tree above. Although these birds are protected, the owner of the hives occasionally had a battue, and shot as many of them as he could, but there were plenty left. When a bird caught a bee it flew back to the tree and beat the insect against a bough, evidently to kill it before swallowing it. Probably the birds have learnt by painful experience that bees possess stings. Indian Mynas (*Acridotheres tristis*) and Pied Grallinas (*Grallina picata*) were very plentiful about the town, and in the outskirts I noticed Forest Kingfishers (*Halcyon macleayi*) and Leach Kingfishers (*Dacelo leachi*), the uncouth sound uttered by the latter being very different from that of the Great Brown Kingfisher (*Dacelo gigas*). In the large strawberry gardens I noticed the Australian Pipit (*Anthus australis*), and was surprised to see it there in preference to the open grass land; probably it found a good food supply in the various insect pests found among the strawberries. Several Whistling-Eagles (*Haliastur sphenurus*) and White-bellied Sea-Eagles (*Haliæetus leucogaster*) were noticed, as well as the White-headed Sea-Eagle (*Haliastur leucosternus*). One of the latter birds had a crab in its claws, but dropped it.

I left Townsville the same day in the *Lass o' Gowrie*, arriving at Lucinda Point at 4.30 a.m., but we found another small steamer there, and, as there was only room for one vessel to discharge at a time, we had to wait before we could commence. During the day I walked a long way along the beach, and noticed that the crabs that burrow there frequently fill up the entrance to the burrow from below with sand. They are exceedingly quick in their movements, and run sideways very rapidly. In time of danger they need speed, as, unfortunately for themselves, they form the favourite article of diet of the White-headed Sea-Eagle. These birds sit quietly on some adjacent mangrove-tree, and when they see a crab wander some distance from its burrow they sail down to the hole from which the crab emerged to keep it from escaping down it. After dodging about for a time in its efforts to escape, the crab, with outstretched claws, starts running in circles, and is soon caught by the bird, which has been just above, ready to drop on its prey.

After leaving Lucinda Point we did not go through the beautiful Hinchinbrook Channel, but outside the island, and arrived off Dunk Island at 1.30 a.m. Fortunately it was moonlight, and the steamer rounded into the splendidly sheltered Brambo Bay. The whistle was blown, and a lantern light was presently seen on the beach. Ere long Mr. E. J. Banfield was alongside in his dingey, and I was soon in it with luggage, mails, &c., and we rowed to the shore, landing on a sandy beach by the boat-shed.

Adequately to describe Dunk Island is difficult; its beauties must be seen to be appreciated. Nutmeg-Pigeons (*Myristicivora spilorrhoa*) were beginning to arrive in their thousands, as well as Bee-eaters (*Merops ornatus*) and other migratory birds, but I was rather too early for them. Scrub-Fowls (*Megapodius tumulus*) were very plentiful, and their nesting-mounds were frequently seen in the scrubs. Often the birds uttered their call during the night from the tops of some trees in which they were roosting. What I took to be the male bird uttered a harsh, guttural crow, followed by the running note of the female (?). Several Bee-eaters had found a swarm of European bees that was hanging on to a branch of a shrub, and were daily lessening their number. Mr. Banfield used to keep many hives of bees, but it eventually came to giving up the bees or shooting the Bee-eaters that attacked them. He decided on the former alternative, as he did not like destroying these beautiful birds. I also noticed Drongo Shrikes (*Chibia bracteata*), Dusky Honey-eaters (*Myzomela obscura*), and Fasciated Honey-eaters (*Ptilotis fasciocularis*), Sun-Birds (*Cinnyris frenata*), and Wood-Swallows (*Artamus leucogaster*). Sulphur-crested Cockatoos (*Cacatua galerita*) were plentiful, and nesting. The Shining Starlings (*Calornis metallica*) were also arriving in numerous companies from New Guinea, and were building their dome-shaped nests in clusters on a tall eucalyptus tree not far from the house. Large-tailed Nightjars (*Caprimulgus macrurus*) were always heard as soon as the shades

of night fell. They kept in the open timbered country, where the ground was comparatively free from short scrub. Pheasant Coucals (*Centropus phasianus*) were very plentiful. They were frequently heard during the day, and often I disturbed them from the path that led to the beach from the house. Edible-nest Swiftlets (*Collocalia esculenta*) were numerous, especially over the cleared ground, where there were fruit and flowers. The birds were just starting to build in the caves. We frequently heard the beautiful clear note of the Brown Shrike-Thrush (*Colluricincla brunnea*), which kept in the scrub.

Mr. Banfield once saw a small bat fly into the web of the large "fisherman" spider (*Nephila fuscipes*), and before he was able to release it the spider had killed the bat. These spiders capture small birds, and, evidently, just as easily kill small bats.

After seven delightful days had passed the s.s. *Mourilyan* hove in sight at 11 o'clock on Wednesday morning, 10th September. Mr. Banfield took me out in his motor launch to meet her. I clambered on deck by the ladder let down for me, and bade a regretful farewell to one of the most beautiful and interesting islands that I have ever had the pleasure of visiting, and to my kind and genial hosts, Mr. and Mrs. Banfield. On Sunday the steamer called in at Mackay, and on Monday morning Port Alma was reached. This is a deep, land-locked harbour, which has only lately been utilized, and is only a short distance from Rockhampton by train. I noticed here eight White-headed Sea-Eagles (*Haliastur leucosternus*) resting on the mangroves at the water's edge, and most of them had their wings drooping. I also noted four Australian Crows (*Corvus coronoides*), which amused themselves by working their way up, branch by branch, until they got close to a Sea-Eagle, when they gave it a push, which made it lose its balance and fly off to rest elsewhere. This was done many times, and I came to the conclusion that the Crows wanted the Hawks to start catching crabs, as this is their principal food, and the wharf is littered with hundreds of crab-shells. But the tide was not far enough out, and the Sea-Eagles would not take the hint. When the Sea-Eagles do catch crabs they occasionally drop one, and those which fall the Crows consider their perquisite. The Crows also like to bully the Sea-Eagles to try to make them drop crabs, or snatch the prey away when the larger birds alight on the pier to eat it. A passenger on the steamer informed me that, not far from here, he fired with a Winchester rifle at a Pelican (*Pelecanus conspicillatus*) that was swimming towards the land. As it did not stop, except to try to fly a stroke at the first shot, he fired five times more, all apparently without effect; but as the bird landed he shot it dead through the head. On skinning it he found that his five bullets had all gone clean through the Pelican, which had managed to swim 30 yards.

We arrived at Brisbane at 10.30 a.m. on Tuesday, and left next day for Sydney. The weather was very boisterous, and there-

fore the Albatrosses gave a fine exhibition of their power of flight. Two species were seen—the White-capped (*Diomedea cauta*) and Wandering (*D. exulans*). The most of the latter were in their darker juvenile plumage, which varies in the different specimens. I have never seen these birds north of Brisbane, and they rarely go nearer the coast than three miles. We saw a flock of Diving-Petrels (*Pelecanoides urinatrix*), and Mutton-Birds (*Puffinus sphenurus*) were very plentiful.

Cuckoos in Tasmania.

BY (MISS) J. A. FLETCHER, R.A.O.U (SPRINGFIELD, TAS.)

I HAVE had very little experience with Cuckoos or their eggs. Have occasionally found the egg of the Fan-tailed Cuckoo (*Cacomantis flabelliformis*) in nests of the Brown-rumped Tit-Warbler (*Acanthiza diemenensis*) or Long-tailed Wren-Warbler (*Malurus longicaudus*); of the Bronze-Cuckoo (*Chalcococcyx plagiatus*) in nests of the Yellow-tailed Tit-Warbler (*A. chrysorrhoa*); and that of the Pallid Cuckoo (*Cuculus pallidus*) in nests of the Yellow-throated Honey-eater (*Ptilotis flavigula*). On one occasion I found the remains of a Pallid Cuckoo's egg in the nest of a Wood-Swallow (*Artamus sordidus*), whose clutch had been stolen.

My sister, on 19th September, 1910, found the nest of a pair of Striated Field-Wrens (*Calamanthus fuliginosus*) in a clump of rushes by the roadside at Conara. It contained two eggs of the *Calamanthus* and one of the Fan-tailed Cuckoo. On several occasions I have observed an adult Cuckoo giving food to a young bird of its own species, which had apparently lately left the nest. I often wonder whether Cuckoos watch over the well-being of their offspring or whether they simply give the crying fledgeling food because, after the manner of young birds, it calls to them as they pass by.

My scout, Miss Lowther, on 4th December, 1913, found a nest of the Emu-Wren (*Stipiturus malachurus*) containing one egg—that of the Fan-tailed Cuckoo. This was left for a week, and, finding that the Emu-Wrens had deserted, I took the nest and egg. The builders had evidently resented the presence of the Cuckoo's egg in the nest. Miss Lowther, on 7th October, 1914, found an Emu-Wren's nest containing two eggs of that species and one of the Fan-tailed Cuckoo. A week previously a Cuckoo had been seen examining the tussock in which the nest was built, though at that time it was not known that the Emu-Wrens were building there.

On 28th November, 1914, I found an Emu-Wren's nest containing a young Bronze Cuckoo. Two Emu-Wren's eggs had been ejected. The young Cuckoo, though only a few days old, filled the tiny nest. An adult Bronze-Cuckoo was heard near by.

Missing Birds.

BY A. J. CAMPBELL, C.M.B.O.U. (MELBOURNE).

ON reflecting, one alights sometimes on beautiful or rare birds which are disappearing, or, perchance, have disappeared for ever, like the Labrador Duck, the Great Auk, and the Passenger Pigeon of America. It would be interesting to know if three beautiful Australian Parrots still exist, or have been exterminated. If the birds are extinct, what is the cause or causes of their extinction? Similar birds may follow suit unless remedial measures are taken quickly. Briefly mentioned, the three missing species of Parrots are :—

1. **Scarlet-shouldered Parrot** (*Psephotus pulcherrimus*).—This most elegant species was fairly common in Queensland and adjacent portion of New South Wales. All that remain to-day appear to be a few stuffed specimens in collections. Perhaps Mr. Chas. Barnard, Coomoboolaroo (Queensland), could state when these birds were last observed in his district, where they existed and laid their eggs in ant-hillocks.*

2. **Chestnut-shouldered Grass-Parrot** (*Euphema pulchella*).—The habitat, in certain localities, of this small, beautiful species extended from Victoria up to South Queensland. Some authorities include South Australia. Many years ago I used to notice the Chestnut-shouldered Grass-Parrot on the flats about the Dandenong Range, about 20 miles to the eastward of Melbourne. The bird frequented the thick, scrubby, alluvial flats, and when flushed flew into the nearest tree, where, on a twig, it displayed its perfect little figure. It was also found at Berwick and other places in Gippsland.

3. **Night-Parrot** (*Geopsittacus occidentalis*).—Being a nocturnal species, this Parrot was always scarce, or was rarely seen, although its habitat extended from North-West Victoria to North-West Australia. My friend Mr. Alfred Walker, who resided at Innamincka, Cooper's Creek, for over 25 years, has frequently seen the bird, but he states that of recent years, according to the testimony of both whites and blacks, the bird has entirely disappeared. Captain S. A. White, M.B.O.U., in his recent ornithological explorations through the interior, was specially on the look-out for the Night-Parrot, but failed to find it, while we know that Victorian field observers, during excursions to the north-west corner of their State, which the Night-Parrot used to frequent, also failed to trace it. Evidently this Parrot has been exterminated. Few skins remain of this remarkable species, while there is not an egg in any collection.

The disappearance of the three kinds of birds mentioned is

* Mr. Barnard has replied :—" *Re* Scarlet-shouldered Parrot. We have not seen a bird since the 1902 drought, and from what I can learn they are very scarce on Fairfield, where we first took their eggs. All being well next September I must try for a run up there to see for myself."

startling, and is, I believe, due primarily to the existence of a fierce breed of wild domestic cats. (I referred to this destroying pest at one of the Union's Adelaide sessions. In North Queensland, where I am at present (November, 1914) staying, I am reliably informed that the tropical scrubs abound with cats gone wild.) Other causes for the disappearance are bush-fires and the reclaiming of forest lands, and, in the case of the two first-mentioned Parrots, trapping in bygone days.

Would it not be well for members to unite to protect or to aid in the protection of some of the fast-failing forms of our avifauna? In point of fact, is not the "protection of native birds" one of the chief planks of the Royal Australasian Ornithologists' Union? I would suggest that a committee be appointed to report on the wild cat question in connection with the destruction of birds. The subject will have to be faced sooner or later.

Notes on Kagus (*Rhinochetus jubatus*).*

By H. E. FINCKH, R.A.O.U. (SYDNEY).

In April, 1905, I succeeded in hatching, but not rearing, a Kagu chick.† At that time I possessed one pair of birds, which had laid yearly.‡ Late in 1905 I secured another pair of birds, and later still another pair, keeping them separated in pairs in different large enclosures. From this time none of my birds either paired or laid.

Three years ago I was persuaded to part with one pair of birds to a Continental Zoological Gardens. I also deposited a pair at the Sydney Zoological Gardens, keeping one pair for personal observation. During the nesting period last year (1913) this pair had an egg, which appears to show that the birds live in pairs, separately, not in company with others. The female at the Sydney Gardens laid an egg last year. The mating came about in a most singular manner. Having only one pair, I almost expected success, watching my birds closely during the mating season. There was no result, however, until the very close of this period.

A Fan-tailed Pigeon laid an egg on the ground in the Kagus' enclosure. The Kagus gathered leaves, &c., and made a nest about this egg, and sat on it in turns. I permitted them to do so for three days, and then removed the egg, to the greatest disappointment of the male Kagu. Within one week the birds mated, and an egg was laid. Unfortunately, it disappeared; perhaps rats took it.

On the 10th July, 1914, an egg was laid, as on previous occasions about dusk. The nest was then made, both birds sitting well.

*The Kagu is a remarkable bird, placed near the Heron order. It is confined to New Caledonia.

† *Emu*, vol. v., part 1, p. 32.

‡ *Emu*, vol. iv., part 4, pp. 166-168.

After 36 days (exactly the same period as in 1905) the egg hatched. It was three months later in the season, though, the birds apparently becoming used to our seasons. The warmer weather at this time of the year made my expectations run high. The egg chipped (one puncture only) on the 33rd day; at noon on the 36th day no further alteration had taken place; at 2 p.m. I found the chick in the nest, quite dry. I could not find the shell or remains anywhere about the nest. On the following day, however, I discovered small parts of the shell 25 feet away. They could not have got to the spot by accident, as there were several foot-high obstacles between it and the nest, and the fragments lay there as if they had been hidden. One of the birds must have carried them there, in order, perhaps, that there should be no sign that a young bird was in the vicinity.

The head of the young Kagu is very large indeed—out of proportion to the body—being one-third the size of the latter.

The parents, when feeding the chick, did not apparently know which was the head; if they got no response on offering food at one end they would try the other. They endeavoured to feed their offspring on the day of its birth, but it did not take food until the second day.

During the first few days the chick opened its bill and the parent birds put worms in; afterwards the chick took food from the beak. On the fourth day it accepted worms 4 inches in length. On the fifth day it swallowed a large cockchafer grub with the greatest ease. From the third day this helpless chick, with great effort, wandered several times each day some 2 feet from the nest, and returned almost immediately. This behaviour puzzled me, until I noticed that it left the nest for sanitary purposes. The distance increased as the bird became stronger. When five days old the chick left the nest occasionally; when 19 days old it ran about, and on the 29th day picked up food accidentally dropped by the parents when feeding it.

It fed on worms, snails, and slugs, of which it ate from 50 to 80 a day. After the third week it almost preferred finely-cut raw beefsteak to anything else; in the fourth week it ate at one meal, twice a day, as much meat as I was in the habit of giving the two adult birds, besides many worms, &c., in between. It was always hungry, and its size doubled in less than a week.

To see the parents feed the chick was charming, their patience being limitless. Though hungry, they would not take any food themselves until the chick refused to accept more. I saw them each trying to coax the young bird to take more food for at least ten minutes before they ate it themselves. When the chick was satisfied, occasionally they would "talk" to it, then hold the food, not to the mouth, but always before the eye, even pushing it in the eye.

Each parent desired to do the actual feeding. If one was given a worm, it carried it to the chick, and its mate would take it out of the bill and offer it to the young bird. If the chick did not

happen to get the worm it might change from bill to bill as many as ten times. Frequently a worm given by one parent to the chick was taken out of its bill by the other and then returned.

On the 31st day small feathers began to replace the down on the shoulders, and a week later the chick's wings were fully feathered. Another week, and the whole body was clad in feathers, dark and light brown, with very little of the grey colour of the adult. At eight weeks the colour had changed to that of the adult, and the bird was half the size of an adult, with a little down just at the base of the bill. It began to pick up food on its own account. In colour the bird resembled the dead, dry leaves, light and dark brown. Visitors frequently were unable to detect the bird as it lay on the nest. No outward appearance in the adult distinguishes the sexes, but in all *Kagus* which I have owned the eye of the male bird was lighter and brighter in colour than that of the female.

Stray Feathers.

New Foster-Parent.—On Monday, 9th November, I found at Ringwood, Vict., a nest of the Spotted-sided Finch (*Stagonopleura guttata*) containing three eggs, together with an egg of the Narrow-billed Bronze-Cuckoo (*Chalcococcyx basalis*). This, I believe, is a new record.—F. ERASMUS WILSON. Melbourne (Vic.), 22/12/14.

* * *

Rail Caught by Cat.—This morning an *employé* brought me an egg of the Pectoral Rail (*Hypotaenidia philippensis*) for identification. He recognized a preserved skin of the species at once, and stated that his cat had caught a live bird the evening before. The bird, apparently uninjured, was placed in a cage, laid the egg in question during the night, and was released in the morning.—H. L. WHITE. Belltrees, Scone (N.S.W.) 29th October, 1914.

* * *

Remarkable *Grallina's* Nest.—A most extraordinary nest of the Magpie-Lark (*Grallina picata*), probably the result of the present drought, was built more than a mile from any water. The birds were unable to get much mud to build their nest in the usual manner. The foundation was composed of wet (when used) cowdung, the balance feathers, dry grass, and wool from dead sheep, mostly the latter, and just a little clay on the side of the nest in a few places; but, as this clay was of a red colour, it did not come from the Talbragar River (the only water for miles), so I can only conclude that they gathered it at a cattle camp near the nesting-tree, the clay being of the same sort. This appears reasonable, considering that part of their nest had been built with wet cowdung.—THOS. P. AUSTIN. Cobborah Estate, Cobborah (N.S.W.), 3/10/14.



Nest and Eggs of Magpie-Lark.



Island Sanctuaries.—In a letter received by Mr. D. Le Souëf, C.M.Z.S., the Director of the Zoological Gardens, Melbourne, Victoria, from the Queensland Department of Agriculture and Stock, it is stated that the Government has proclaimed Raine Island, Hinchinbrook Island, Gould Island, Garden Island, Agnes Islet, Eva Islet, Channel Rock, and the Barnard Group as reserves for the protection of native birds. The lighthouse-keeper at North Barnard Island has been appointed the ranger for the Barnard Group, and at present the authorities are in communication with two selectors on Hinchinbrook Island in connection with their appointment as rangers of that place. The assistance of the Police Department is also being sought to prevent any breach of the Acts on the islands for which no ranger can be appointed. The R.A.O.U. is extremely gratified at the action taken by the Queensland Government.

* * *

Bird Protection.—As an illustration of the fact that an ardent oologist may also be a bird-lover, the following birds have reared, or are rearing, young during the present season within a radius of 50 yards of my office where I write this:—*Geopelia placida*, *Psephotus hæmatonotus*,* *Halcyon sanctus*,* *Cuculus inornatus*, *Chalcococcyx plagosus*, *Hirundo neoxena*,* *Petrochelidon ariel*,* *Micræa fascians*, *Rhipidura tricolor*, *Seisura inquieta*, *Lalage tricolor*, *Coracina robusta*, *Acanthiza chrysorrhoa*, *Malurus cyaneochlamys*, *Artamus sordidus*, *superciliosus*, *Colluricincla harmonica*, *Pachycephala rufiventris*, *Pardalotus punctatus*,* *Aphelocephala leucopsis*,* *Ptilotis penicillata*, *Ptilotis chrysops*, *Zosterops ceruleus*, *Grallina picata*, *Tropidorhynchus corniculatus*, *Stagonopleura guttata*.—H. L. WHITE. Belltrees, Scone (N.S.W.), 28th October, 1914.

* * *

Starlings Useful.—An interesting statement regarding the value of Starlings has been made by Mr. H. B. Slaney. He states:—"I am convinced that the Starling is a most valuable bird to agriculturists in southern Victoria. Certainly, my experience is not very great, but I know of no birds south of the Divide, equal as far as numbers are concerned, which visit our farms and pasture lands and consume such vast quantities of caterpillars and insects as the Starlings. I saw none of these birds leave for their nests with less than three caterpillars in its beak. One morning I observed several making for the nests with their beaks so full that they had to settle on the ground, and, after emptying their beaks, swallow some of the food before they could make a fresh start. I know that they are troublesome to fruit-growers who leave their trees unprotected, but to agriculturists and pastoralists their value is inestimable."

* Breeding in artificial nesting-places.

The Crimson Parrot (*Platycercus elegans*).—A letter signed "Tavistock," in the last *Ibis* (October, 1914), records a successful attempt to induce a pair of Crimson Parrots (*Platycercus elegans*) to breed in captivity in Great Britain. The writer was surprised to find that the young birds have, with the exception of a few greenish feathers on the wing, "the full crimson plumage of the adult." The writer considered this a "most interesting and remarkable" circumstance. The editors of *The Emu* were just about to record a similar occurrence in a note on a photograph forwarded by Mr. Randall Smith, head teacher of State School, Wodonga West. The photograph showed a young Crimson Parrot, one of a clutch of three young wild birds taken last year from a nest in a hollow in a eucalypt. Each was, with the exception of a few green feathers on the wing, in the full crimson and blue plumage of the adult.

* * *

Birds and Drought in the West.—I had an interesting trip the other day getting military horses. Thirty miles west of Moora we motored through a flock of 300 Black Cockatoos (*Calyptorhynchus baudini*), which flew along in front of the car for nearly a mile. I also saw on that trip some hundreds of Bare-eyed Cockatoos (*Cacatua gymnopsis*). They were using their long bills to dig up yams in a field. This year, which is a very dry one, has driven the Princess Alexandra Parrakeets (*Polytelis alexandrae*) down as far as Three Springs, where several young were observed last season. The spread of settlement in the drought areas in Western Australia will make a great difference to bird life. Bustards are increasing wonderfully, and also Quail of different species, while the lack of cover has driven many other birds back. We are having a dreadful drought this year—in fact, it is the worst year since settlement took place.—E. A. LE SOUËF, Director Perth Zoological Gardens. Perth, 22/9/14.

* * *

Destruction of Herons.—Strong representations regarding the wearing of plumes of Egrets and other birds were made in Sydney to the Inter-State Commission by the Council of the Wild Life Preservation Society of Australia. It was pointed out that the present proclamation had failed in its object. The Council suggested that the present proclamation be cancelled and a fresh one issued, prohibiting the importation of all plumage other than that suggested by the Council. Among other evidence of local destruction of Herons, it was stated that during the past winter numbers of women were to be seen wearing the sections of the backs of Egrets, undressed in any way, the hat being frequently covered with these sections. One of the vice-presidents of the society, Mr. D. G. Stead, Chief Inspector of the Fisheries Department, who is now travelling abroad for his department, intends collecting information in America as to the working of the prohibition measures in force there. Measures have also been taken



Nest and Eggs of Painted Honey-eater.

by the Council of the Royal Zoological and Acclimatization Society of Victoria as to that State, and the Government has promised to bring in a bill dealing with the matter and making it illegal to have in possession the plumes of Egrets and other birds. The Council is of opinion that only such legislation will prevent the wearing in hats of the feathers of our useful birds. Other scientific societies in the different States have been written to, and they will probably endeavour to get their Governments to pass a similar bill.

* * *

Painted Honey-eaters. — While riding through one of the paddocks of the Cobborah estate, on 24th September, 1914, I saw a pair of Painted Honey-eaters (*Entomophila picta*) fly into a pine-tree, and then into two other pine-trees. In the third tree was their nest, on to which both birds went for a few seconds, one after the other; then both flew away. The nest appeared to be practically completed, so I visited the tree again on the 27th. For a few minutes I could see neither nest nor bird, and was just starting to ride away when the male appeared, and went to the nest for about one second, then flew off. I sat down about 10 yards from the tree, in a position where I had as good a view of the nest as I could possibly get. After watching it for a few minutes I thought that something moved on it, and upon closer inspection there seemed to be a bird sitting in the nest. I started to climb the tree, and when I was within about 10 feet of the nest the female bird hopped off, but did not fly away. She came a little closer, had a good look at me, and went back on to the nest. Then the male appeared and fed her (that, evidently, is what he was doing when I saw him go to the nest at first). The nest was at the extreme end of a thin branch, about 30 feet from the ground, so I had to scoop the eggs. While I was doing this the two birds were hopping about, sometimes in the nesting-tree, but mostly in a dead box-tree a few feet away. Both birds uttered a peculiar, plaintive kind of a whistle the whole time. I cut off the branch containing the nest. I shot both birds, and when skinning them found the stomachs full of mistletoe berries. — THOS. P. AUSTIN. Cobborah Estate, Cobborra (N.S.W.), 4/10/14.

* * *

Extension of Localities.—During my recent visit to Northern Queensland, Mr. Isaac Henry informed me that he had on more than one occasion observed an Emu-Wren (*Stipiturus*) on the Bellenden Plains (Cardwell district). *S. malachurus* has not been previously recorded for Northern Queensland, but whether it be the same as the southern form or not remains to be proved.

Mr. E. M. Cornwall, R.A.O.U., presented me with a skin of a male Regent-Bird (*Sericulus chrysocephalus*), taken above the line of Capricorn, in the mountain range behind Mackay. The furthest north recorded for this species is the Mackenzie River

(Rockhampton district).* Mr. Cornwall states that Regent-Birds are fairly numerous in the locality first mentioned. In comparing the specimen with birds from New South Wales, it will be observed that the former has the dark plumage blacker and the yellow parts slightly more intense in colour, which naturally would be the case of the same species of a southern bird found within the tropics.

Red-browed Finches (*Aegintha temporalis*) are numerous in the Mackay, Townsville, and Cardwell districts. I also had evidence of the Satin Bower-Bird (*Ptilonorhynchus holosericeus*) in the last-mentioned locality. The late Mr. Kendall Broadbent recorded having collected both the Red-browed Finch and the Satin Bower-Bird in the Cardwell district.† Therefore, perhaps, they should not have been omitted for "N. Queensland" on the "Check-list," notwithstanding that the smaller forms, *Aegintha minor* and *Ptilonorhynchus minor*, respectively occur within the same region, but further north.—A. J. CAMPBELL. Melbourne, 20/12/14.

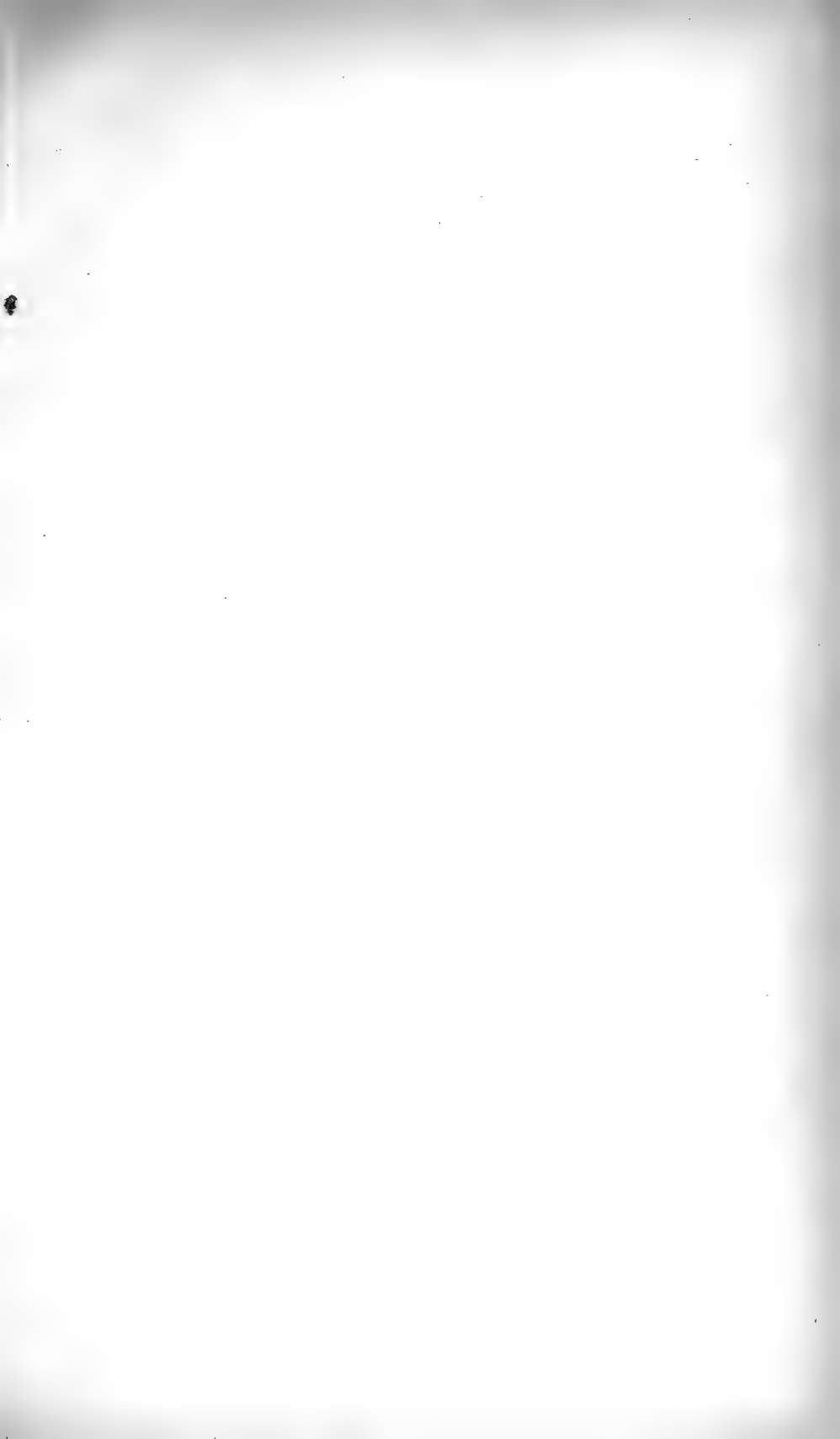
* * *

Notes on the Nankeen Night-Heron (*Nycticorax caledonicus*).—Until quite lately I regarded the Nankeen Night-Heron as being shy, comparatively rare, and strictly nocturnal in habit. These views were all upset last week. On the 9th December, accompanied by a well-known Sydney solicitor, I travelled by train along the Northern railway line. When passing a swamp on Barooka Estate, near Singleton, I observed large numbers of White-necked Herons (*Notophox pacifica*) and Straw-necked Ibises (*Carphibis spinicollis*) feeding in the shallow water, and drew my friend's attention to the birds. He remarked—"Oh, that is nothing; wait until you see the queer-looking brown birds further down the line." After passing Maitland we ran through more swamps, and there the fun commenced. There were Night-Herons, thousands of them, nearly all busy feeding at 3 p.m. Some were flushed by the train from within the railway fences; these often settled on the fence, and calmly watched us pass. Hundreds were within as many yards of us, while as far as one could see over the swamps the birds appeared to be equally as numerous, and all were busy feeding among the low swamp-grass.

As far as I could judge, all the birds were in fully adult plumage. I have travelled the line for very many years, and never previously noted even a single Night-Heron; why they are now congregated in such vast numbers is a mystery. The season along the coast has been good all through, and swamps everywhere are full. Why, then, should the Herons crowd on to certain areas traversed by one of the busiest railway lines in Australia? The track in question carries four sets of rails, and provides an outlet for the great coalfields of the Maitland district, the pastoral and

* North, "Nests and Eggs of Birds," vol. i., p. 61.

† *Emu*, vol. x., pp. 237 and 238.





Mistletoe-Bird, ♀, Feeding Young in Nest.

FROM A PHOTO. BY CHAS. BARRETT.



Mistletoe-Bird, ♀, at Nest (a typical attitude).

FROM A PHOTO. BY CHAS. BARRETT.

agricultural produce of northern New South Wales, and the passenger traffic of the whole of the North. In "Nests and Eggs of Birds Found Breeding in Australia and Tasmania"* appears a very interesting note by Mr. T. P. Austin, of Cobborah. He describes a visit to the breeding-place of the Night-Heron in Port Stephens. In a direct line Maitland and Port Stephens are not more than 30 miles apart, so that it is possible that the birds I saw form part of the Heronry in question.—H. L. WHITE. Belltrees, Scone, N.S.W., 13/12/14.

* * *

Birds and the Camera.—In the course of the present (1914) nesting season in Victoria, I was fortunate in securing a series of photographs of the Mistletoe-Bird (*Dicaeum hirundinaceum*) and the Buff-tailed Tit-Warbler (*Acanthiza reguloides*). Early in October Messrs. S. Lawrence and R. T. Littlejohns informed me that they had located the nest of a pair of Mistletoe-Birds, suspended in a eucalypt sapling growing on a hill slope at Ferntree Gully, Dandenong Ranges. In company we visited the spot on a warm, sunny day, and spent several hours there, observing the birds and taking photographs. The nest, which contained two young birds about four days old, was less than 10 feet from the ground. Some old fence-rails were used to form a rough platform, and a camera was fixed close to the nest. After focussing and making everything ready for an exposure, I retired, and at the end of 30 feet of rubber tubing awaited the return of the birds, which had been moving about restlessly among the foliage of trees adjacent to the sapling. Nearly 20 minutes passed before one of the birds ventured to approach the nest. It was the female. She flew to the sapling, above the nest, peered at the camera, which evidently was regarded with some fear, and showed signs of indecision. But soon mother-love vanquished fear, and the dainty bird flew to the nest. Clinging to the outer wall, with her tail braced against it, she thrust her head inside, and began to cleanse the nursery. The camera shutter clicked, and away flew the bird to a tree some dozen yards distant. Within ten minutes she was back again, and this time brought food. Her actions, too, were less fearful, though she flew when another plate was exposed. In the course of an hour the female made many visits to the nest. Once the male alighted in the sapling, carrying food in his bill, but declined to come to the nest. A week later my companions, who were also successful with their camera on the first occasion, spent an afternoon on the hill slope, and secured photographs of the male bird, and of the female feeding the young, which were out in the world. The mother bird even alighted on an outstretched hand, on which a fledgeling was perched.

It was while spending a brief holiday at "The Bungalow," Paradise, near Gembrook, in November, that I found the nest

* "Nests and Eggs," North, vol. iv., pp. 35, 36.

of a pair of Buff-tailed Tit-Warblers, placed among the clay-clogged roots of a fallen gum-tree. I was in search of Pardalotes' nesting-tunnels, and at first overlooked the Tits' nest, which was cosily built in a tiny cave—a framework of roots, from between which the earth had been delved or else had crumbled away. The female bird flew from the nest as I climbed a stairway of roots to examine it. The camera was erected on the ground, the lens being about 8 feet from the nest. The bird returned within 10 minutes to feed three nestlings, which were, I judged, just ready to fly. Two photographs of the bird at the nest were secured; then I was summoned to the house, which was not far away. When I inspected the bird-home again, after a brief absence, it was empty. The parent birds had taken the brood away, a day, perhaps, before the appointed time, as a result of my intrusion on domestic privacy. However, a search of the neighbourhood was rewarded by the discovery of two of the young Tits, which were captured, and ranged on a slender branch close to the ground. They fluttered off the perch repeatedly, encouraged by the notes—alternately angry and solicitous—of their parents, which darted around me or flew over the bough. They were joined by three other birds of the same species, and there was a great commotion. A pair of White-shafted Fantails (*Rhipidura albiscapa*) also displayed some interest in the proceedings, and probably had a nest near by.

At length one of the fledgelings remained still on the branch, and cried for food, which its parents did not deny. Though the camera was standing within a few feet of the perch, one after the other the old birds ministered to the needs of their hungry offspring. Green caterpillars and small moths and other insects were included in the menu. As the baby bird was beginning to feel the sun-glare, I placed it in a shady spot, beneath the tree to which the other fledgeling had flown, and presently saw it lured away by its parents.—CHARLES BARRETT. Melbourne, 5/12/14.

From Magazines, &c.

“**Austral Avian Record.**”—The *Austral Avian Record*, vol. ii., No. 5, 24th September, 1914, shows that that prolific worker, Mr. G. M. Mathews, still maintains his large output, and is studying original sources with avidity and good results. All admit and admire the fine work he is doing, and look forward to the day when he will satisfy himself that his work on Australian birds cannot be further improved.

Mr. Mathews has now succeeded in fixing the place of origin of several species “ascribed to Australia.” He says, “Pucheran has noted that some of these are Timor birds, and, therefore, can be eliminated” from Appendix B. of the 1913 “List.”

An article entitled “Additions and Corrections to my List of the Birds of Australia,” by G. M. Mathews, makes, independent of



Buff-tailed Tit-Warbler at Nest.

FROM A PHOTO. BY CHAS. BARRETT.



Buff-tailed Tit-Warbler Feeding Young.

FROM A PHOTO. BY CHAS. BARRETT.



consequential changes, over 70 changes and additions of names. About 30 new sub-species of Australian birds are included.

A further instalment of "corrections" is rendered necessary as the result of a short article entitled "New Genera," by G. M. Mathews. This creates 14 new genera for Australian birds grouped by Mr. Mathews in his 1912 and 1913 lists with other Australian genera. Apparently no fresh material has caused this change, for no new species is named. Over 500 genera are now used by Mr. Mathews for a total of approximately 670 species of Australian birds recognized by him. "The A.O.U. Check-list of North American Birds" uses 322 genera for 800 species. One almost feels driven to ask is the day approaching when each Australian genus will contain one species. It is approximately so in several groups under Mr. Mathews's recent splitting.

After the "ample material and careful consideration" used for his 1912 "Reference-list," which reduced the number of Australian genera to 276, and the drastic changes of the 1913 "List," it is surprising that Mr. Mathews is able to produce this large number of new genera in a three-page article so soon after the issue of those lists.

Two substitute names are included in the article on genera, one in a short article by Mr. Iredale, and one in the "Additions and Corrections." "One-letterism" or "two-letterism" is responsible in each case. Mr. Mathews gives *Ctenanas* as a substitute for *Leptotarsis*, antedated by *Leptotarsus*, *Alphagygis* as a substitute for *Gygis*, antedated by *Gyges*, and *Dorothina* as a substitute for *Meliphaga*, said to be "invalidated" by *Melophagus*. Mr. Iredale changes his substitute name for *Antigone*, the Australian Crane, from *Mathewsia* to *Mathewsena*, because of the prior names *Mathewsia* and *Mathewsium*. Mr. Iredale says (p. 81):—"Though there can be no argument that these names are different, having been introduced to honour different workers, the differences are too slight for practical purposes. Therefore, abrogating the recommendation as suggested by the American Ornithologists' Union throughout their Check-list, and inserted in their code, I introduce *Mathewsena* to replace my own *Mathewsia*." Mr. Mathews says (p. 111):—"I would note that under the rules adopted by the American Ornithological Union the genus name *Meliphaga*, Lewin, 1808, is invalidated by the prior *Melophagus* of Latreille in Sonnini's Buffon Ins., vol. iii., p. 466, 1802. I introduce *Dorothina* nom. nov." While Mr. Iredale implies that under the A.O.U. "recommendation" *Mathewsia* is valid, Mr. Mathews claims that, under the A.O.U. "rules," the more unlike *Meliphaga* is "invalidated." The general reader will probably have difficulty in deciding which interpretation represents the views of the *Austral Avian Record*. The A.O.U. "Check-list" custom will not support Mr. Mathews. Some substitute names, previously proposed by Mr. Mathews, appear as synonyms in his 1913 "List." Possibly a similar fate in his next list awaits some of these substitute names.

Reviews.

[“Friends and Foes in the Australian Bush.” By Edward S. Sorenson, author of “Life in the Australian Backblocks,” “Quinton’s Rouseabout,” &c. Illustrated by Ernest E. Barker, R.A.O.U. Whitcombe and Tombs Ltd., London, Melbourne, Christchurch.]

THIS well-illustrated and interesting volume consists of 18 chapters, each dealing with an Australian animal. The subjects are chosen so as to give the general reader a good idea of some of the remarkable members of the unique fauna of this “island continent.” Ten of the chapters deal with birds. These are entitled “Spotty, the Bower-Bird,” “Jack, the Kookaburra,” “Bluey, the Wren,” “Crane and Jabiru,” “Marriang and Wadgie, the Emus,” “Curlew and Mopoke,” “Narran, the Lyre-Bird,” “Gweela, the Brush-Turkey,” “Maggie, the Magpie,” and “Karaway, the Cockatoo.” Each deals with the life and habits of the chosen bird in a delightfully interesting manner. Usually an account of the relatives of the central figure is also given.

The writer is evidently a lover of birds and the bush, and, with the assistance of the artist, lures the reader on until he has reached the last page. Some of the names used for the animals treated are local names, and the bird-lover may at times experience difficulty in recognizing the bird described. The proof-reading is hardly up to the general standard of the work. Though author and artist evidently gave the correct vernacular name of the vegetable-eating phalanger, as possum, the mistake has been made of printing “opossum,” the name of the fish-eating marsupial of North America. Confusion still reigns concerning the naming of Australian animals.

The fine illustrations are from the pen of E. E. Barker, a member of the Royal Australasian Ornithologists’ Union. They aid the author considerably in producing an ideal gift-book. Publisher and printer, with the slight exception mentioned, have done their part well.

[“The Birds of the District of Geelong, Australia.” By Charles F. Belcher. W. J. Griffiths, Geelong, Victoria.]

MR. Belcher, who was at one time co-editor of *The Emu*, has broken fresh ground in this volume. One hopes that it will not be long ere others of a similar character are published. As the author states, every county in England has its own bird-book, written by its local men. There are many large districts in Australia whose birds should be dealt with in separate volumes. Ornithologists who consider that too much importance has been attached to “locality lists” will not find any fault with this book, which is not a mere list of species, buttressed by a few field notes. It is a record of the author’s observations, extending over some 25 years, upon the birds inhabiting the district lying about his native town. From childhood he has found charm and delight in bird-watching.

Mr. Belcher confesses "that the argument that we should study and protect our native birds because of their economic utility" leaves him rather cold. He admits that most species of native birds, in obtaining their food, do greatly help the farmer, orchardist, and gardener, but finds "the most compelling claim of Australian birds upon our affections to lie not so much in their money value as in the direct influence of beauty which they will exert upon anyone who cares to open his eyes and ears to the life that is all about him by green forest, open plain, or sounding shore." One has to read only a few pages of the book to discover that its author is a true naturalist, an observer, who delights in all living birds, even the Cormorant, which "reveals a shining lustre on his ebon wings which not art of modern silk-weaver could hope to imitate." He is fortunate in his district, which presents great diversity—plains, rivers, reedy swamps, lakes, mud-flats, and forest areas. He records no fewer than 244 species, and has no doubt that further investigation would add from 20 to 50 more to the list. The Geelong, it is justly claimed, is a thoroughly representative Victorian district. The author has adopted, "as far as was applicable," the scientific nomenclature of Mr. Gregory Mathews's "List of the Birds of Australia," published in 1913 in connection with his monumental work, "The Birds of Australia."

While packed with accurate observations, the pages of Mr. Belcher's book are brightened by many excellent bits of descriptive writing. For example:—"I remember one June morning at Inverleigh—a fine winter's morning, but white mists filled the valley of the river, so that only here and there could you see the tops of the red gums—and from these red gums there poured from a hundred unseen throats of early-mating Magpies a chorale of the joy of life unquestioned, which will never be equalled for me by any carol of Thrush, or Nightingale's song of the northern June in a Surrey copse."

The fifty illustrations from photographs are mostly of a high standard, and the volume is well produced.

About Members.

THE editors have received the following communication from Mr. A. J. Campbell:—"After an absence of over three months, I have returned from Northern Queensland. The trip was pleasant and profitable—a continuous feast for a bird-lover. I touched at Dunk Island, historical for some of Gould's types, collected by Macgillivray, and now the well-known home of our member and energetic writer, Mr. E. J. Banfield. I also visited the Cardwell district, the "happy hunting grounds" of E. P. Ramsay and the late Kendall Broadbent, not to mention my own exploits there in 1885 with Messrs. Coles Bros. and A. Guiliver. I brought back little material; my work was chiefly observing

and photographing. I exposed about 130 plates. Many of the subjects, I hope, are unique. For instance, the Large-tailed Nightjar on its nest, several tree-orchids and terrestrial orchids in bloom, scenes in the picturesque Hinchinbrook Channel, &c. I received open-handed hospitality from the Queensland members of the R.A.O.U. whom I met—Mr. and Mrs. Banfield, Dunk Island; Messrs. and Miss Gulliver, Townsville; Mr. and Mrs. Cornwall and Messrs. Harvey Bros., Mackay; and Dr. Hamlyn Harris, Brisbane; besides numerous other private friends.

"The idea of the Royal Australasian Ornithologists' Union meeting in Queensland, especially the north, next year (1915) is excellent. There will surely be a great response in that State."

Obituary Notice.

By the death of Mr. Max Egger, which occurred at Tumut in November, 1914, the Union has lost one of its most enthusiastic members. A keen field ornithologist, Mr. Egger had an unrivalled knowledge of Riverina bird life. A Victorian bird-lover, who had the privilege of spending some days with him in 1913 in and around the Jerilderie district, found Mr. Egger a delightful companion—generous, kindly, and modest. The news of his unexpected death caused deep regret in Jerilderie, where he had lived for many years, and the feeling will be shared by members of the Union.

In an obituary notice in its issue of 27th November, 1914, the *Jerilderie Herald* stated that Mr. Egger had driven from Jerilderie to Tumut a week before his death, and probably contracted pneumonia on the way. When he left he appeared to be in his usual health. "The deceased" (this journal states) "was a quiet, inoffensive man, and was generally liked and respected by everyone, both in town and district. He came to this town nearly 19 years ago from Tumut, where he previously resided. He was a native of Switzerland, and shortly after his marriage had to come to this country for the benefit of his health. He started in business here as a watchmaker and jeweller in 1896, but had to relinquish it and seek a more out-of-door occupation. Being an ardent ornithologist, he commenced bird-trapping and photography. In this pursuit he continued for years."

Notes.

ANY member requiring at least 30 different parts of *The Emu* of former years' issues available, if the Council approve, may obtain them at the specially reduced price of 1s. per copy.

MESSRS. Witherby and Co., London, notify by advertisement in this issue that on the completion of the present volume (iv.) the subscription list for Mr. G. M. Mathews's "Birds of Australia" will be absolutely closed. Intending subscribers should, therefore, place their orders without delay.

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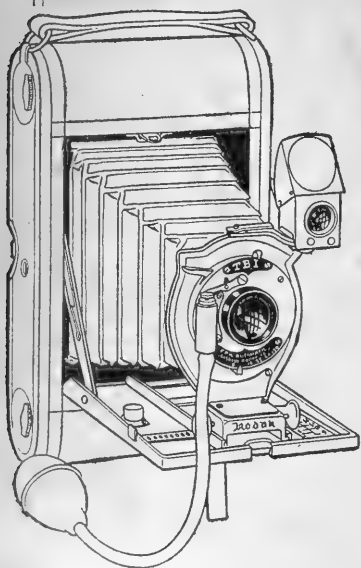
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The Emu

A Quarterly Magazine to popularize the Study and Protection
of Native Birds.

Official Organ of the ROYAL AUSTRALASIAN ORNITHOLOGISTS' UNION.



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Official Organ of the Royal Australasian Ornithologists' Union.

"Birds of a feather."

VOL. XIV.]

1ST APRIL, 1915.

[PART 4.

An Expedition to the Musgrave and Everard Ranges.

BY (CAPT.) S. A. WHITE, M.B.O.U., PRESIDENT R.A.O.U.

IT was only in October, 1913, that my wife and I returned from a 1,300-mile camel trip from Oodnadatta into the Macdonnell Ranges. The account of this expedition and the work accomplished has been published by the Royal Society of South Australia, vol. xxxviii., 1914. In May, 1914, news came to hand that the Government of South Australia was fitting out an expedition to explore the country to the west of the head of the railway line as far as it was possible within the space of six months. Now, this country had been included in my programme of the year before, but I had cut it out, on account of bad news concerning the natives. As I had my wife with me, and my party was small, I did not wish to run unnecessary risks. Now was my chance to get into this country under the wing of a large party, and, by courtesy of the Minister for Mines, Sir Richard Butler, I was unofficially attached to the party. Having had a very hard time the previous year doing all the collecting and curing of specimens, besides looking out the route, &c., I determined to take assistance with me. Extreme luck came my way, as I was able to secure the valuable services of Mr. J. P. Rogers, a man whose name will be remembered for the work he did alone while collecting for Mr. G. M. Mathews in the North-West of Australia.

In the early morning of 17th June, 1914, our party caught the fortnightly train to Oodnadatta, and reached there, at the dead-end of the line, after three miserable days' railway travelling to cover 700 miles through a drought-stricken country. We found that our camel team, which was on its way up from Hergott Springs, had not arrived, and we were delayed two or three days. For the first part of this time the leader of the expedition kept us busy getting the outfit in order; but after that my assistant and myself put in the time working the district ornithologically, with much success.

The expedition moved out one morning to the north-west, and comprised Mr. R. L. Jack, Assistant Government Geologist, leader; the writer and his assistant, Mr. J. P. Rogers; W. Williams and J. Nicholls, prospectors; J. Sullivan, camel man

and cook: and two blackboys, "Scoundrel Bob" and "Billie." Our camels consisted of 16 cows and a riding camel, which was shared by my collector and myself. Later on, Nicholls, one of the prospectors, through the roughness of the trip, gave up and returned.

For the first 70 miles between Oodnadatta and the Alberga River we passed through the well-known cattle run of Todmorden; but this country will be for ever famous simply because it has yielded that long-lost bird of John Gould, *Xerophila pectoralis*. Leaving the hospitable roof of Todmorden cattle station, whose owner, Mr. J. A. Breaden, is an old explorer, having come through to South Australia from Western Australia on two occasions, we plunged into the dense mulga scrubs and soft sands that were to be our surroundings for a long time to come. Our camels, walking along one after the other, and twisting and turning to avoid obstacles, looked in the distance like a huge centipede. They averaged from 13 to 15 miles a day, our longest run being 22 miles. We followed up the Alberga for some days. As this dry water-course trended somewhat to the north, we continued westerly, and passed over high table-lands covered with gibber stones, which made our camels very footsore. Arriving at the Yooiperlunna Creek, we camped at a water-hole, called by the natives Allarinna. This was the last water-hole in the bed of a creek we were to see on the trip.

Crossing over more table-lands, we at last descended on to flat, soft country, covered with salt-bush and occasional clumps of mulga (*Acacia aneura*). Our daily routine varied little. Up soon after daylight, we breakfasted, placed a piece of damper and meat in our pockets for lunch, struck camp, loaded camels as soon as they came in, and the camel train moved off. My assistant and I took our guns and bags and set off, one on either flank. We walked till mid-day, when we came in to the camels for a drink from our water-bags, and took an hour's spell on the camel in turn. During this time we ate our lunch, then off again in search of specimens. We came in about 5 p.m., when the party camped for the night. After the camels were unloaded, tents pitched, and supper partaken of, we both set to work skinning birds. After this I packed away botanical specimens, insects, and many other things, and wrote up my notes, which invariably took me into the early morning. To continue with our journey: We were passing through a much better country. A great deal of salt-bush covered the flats, and clumps of mulga relieved the monotony. Here and there a "cork tree" (*Grevillea juncifolia*) was met with in full bloom; some of the blossoms measured 8 to 10 inches in length, and were full of honey, much appreciated by the ants, which swarmed up the trees in thousands. Strange to say, there were few honey-eating birds in this region. Reaching a piece of low ground, called by the natives "Wanta Pella," to which is added "swamp" by the white man, we found there was not the slightest sign of moisture. Here we rested a day



Granite Rocks, Everard Ranges (*Triodia* in foreground).

FROM A PHOTO. BY CAPT. S. A. WHITE.



Ants' Nest. Ants form food of Tree-creepers.

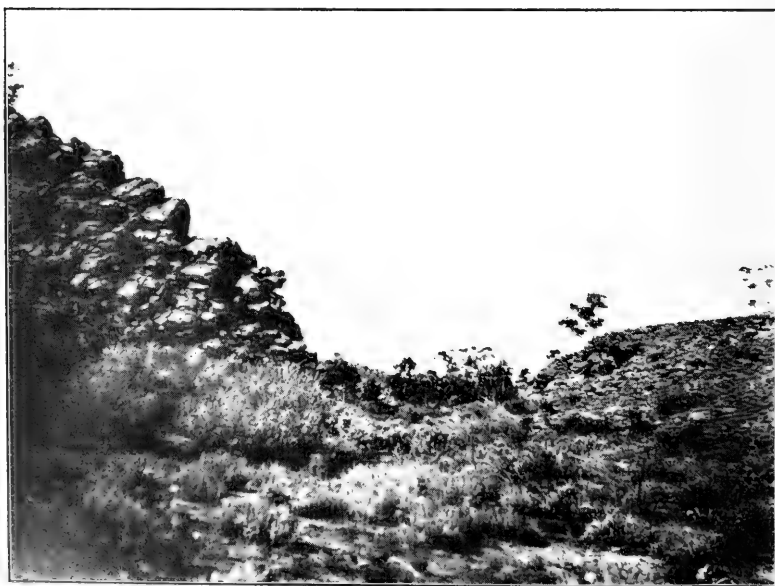
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Tietkens' Birthday Creek, Musgrave Ranges.

FROM A PHOTO. BY CAPT. S. A. WHITE.



Chandler Range, Home of Grass-Wren.

FROM A PHOTO. BY CAPT. S. A. WHITE.

while loads were adjusted and some of our stores were left at a depot to await our return.

Once again upon the move, we made for the Chandler Range, which showed up to the north-west. It is a low, rugged range, with a perpendicular face on the south side and a gradual slope towards the north. It was along this side we made our way, and camped one night just outside the rough gorge leading to Indulkana Springs. Next morning our leader, Mr. Jack, Mr. Williams, and the writer took two camels with a water keg on either side of each and followed the rough bed of the gorge till we came to the springs. From the largest, which contained about 1,000 gallons of water, we filled the casks, rejoined our party, and continued our course to the westward. The collecting of birds, botanical specimens, insects, &c., was going on all the time, but the extreme dryness accounted for the scarcity in animal and plant life.

At last, one day the Musgrave Ranges, shrouded in blue and purple mists, showed up in all their grandeur. For days we travelled towards these ranges. Sometimes we were battling amongst dense mulga scrub, and could see but a few yards ahead of us; but hardly a day passed that we did not mount some sand-hill or rocky ridge from which we caught a glimpse of the blue hills in the distance. The last two days before reaching the ranges were very trying to man and beast, for we had to plough through high spinifex (*Triodia pungens*), which punished the camels badly, and at other times to force our way through dense mulga scrub.

This fine range held many expectations for me, but, alas! I was much disappointed, for not a drop of water could be found. We penetrated into the very heart of the range, and, not finding any water, had to hurry down Glenferdinand (where we came upon the marked tree of Ernest Giles, that intrepid explorer, who was the first to visit the range, in 1872-3), and on to Tietkens' Birthday Creek, which we followed for many miles without finding a drop of the precious fluid. We had to make a forced march back to the rock-hole where we had procured the last water. From this base many attempts were made by flying trips into the range to discover water, but all failed. During the absence of our leader on one of these flying trips in search of water I was compelled to fall back with the main party on water still further back, because our depot water had nearly given out. We, however, left enough in the hole to carry on our leader and his companion after us. During all this time I was able to add to my collection of plants and animals.

Finding it a hopeless job, on account of the drought, to get back into the Musgrave Ranges, our leader shaped his course more to the south. Penetrating a dense mulga scrub, we at last found ourselves amongst the very picturesque Everard Ranges. Huge masses of red granite rose up on every side. Acres and acres of the huge dome-shaped hills were destitute of all vege-

tation, but the flats in between were covered with bloodwood, *Grevillea*, *Acacia*, and fig-trees. We depended entirely upon the rock-holes in the ranges for water for the camels and ourselves. Bird-life was much more plentiful amongst these ranges, and my assistant and myself were kept very busy collecting and curing specimens. Owing to the small quantities of water held by the rock-holes, which our camels soon exhausted, we were necessarily nearly always on the move. We penetrated further to the west, and our leader was busy mapping out new country and tracing the course of new water-courses and ranges. We passed through the Everard Ranges on our return, and it was here that we met the finest aborigines that it has ever been my fortune to fall in with. They were well grown and nourished, and were a fine race of people.

From the Everard Ranges we passed over a very rough piece of country covered in dense mulga; then followed the Indulkana Creek till it joined the Alberga, a little north-east of Mount Mystery. We continued along the dry, sandy bed of the Alberga for days, till Todmorden cattle station was reached. On the following morning, at daylight, I left with the owner, Mr. J. A. Breden, on the long drive into Oodnadatta, leaving my assistant and collector, Mr. J. P. Rogers, to bring on my collections with the camels.

This is but a very brief sketch of an expedition teeming with interest, the details of which would fill a book to overflowing. In conclusion, I must say that bird-life is not nearly so plentiful in this north-western country as we found it the previous year between Oodnadatta and the Macdonnell Ranges. Many of the forms found farther north and in the Macdonnell Ranges were met with, but there were some forms quite distinct from any seen in the central regions. These include *Neopsephotus bourkii* (Blue-vented Parrot), *Gerygone* (sp.?), *Certhionyx variegatus* (Pied Honey-eater), *Aphelocephala pectoralis* (Chestnut-breasted White-face), two species of *Acanthiza*, and probably *Ashbyia lovensis* (Desert Bush-Chat). Although Mr. J. R. B. Love reports having met this bird nearly as far north as Charlotte Waters, I am of the opinion that it is only on rare occasions that it goes so far into the centre of Australia.

The country collected over on this trip can be put into three classes. Firstly, the great tracts of often very dense mulga (*Acacia aneura*), growing mostly on soft, sandy soil, and covering the greater part of the country travelled over. Where this shrub (one cannot call it a tree, for it rarely attains a height of from 15 to 20 feet) was very thick, little or no bird life was found, for we journeyed days at a time without seeing a single bird, and those met with were of the *Acanthiza* group. Where large spaces of clear, sandy country, covered in dry grass, were met with amidst the great mulga scrubs, an occasional *Epthianura* or *Anthus* was seen. The second class of country was the innumerable dry water-courses. Up their deep sandy beds we

often travelled for many miles. Both banks were invariably lined with red gums (*Eucalyptus rostrata*), which were often of fine proportions. Amongst the gum-tops Tree-Tits (*Smicromis*) and Pardalotes were found. Amidst the low scrub on the banks, mostly composed of two or three species of *Acacia*, a fair variety of birds was met with. The third type of country, and the most prolific and interesting, was the vast masses of granite rising up, as in the Musgrave Ranges, many thousands of feet into the sky. In other places, sometimes in the midst of a dense mulga scrub, we found a collection of huge granite boulders piled one upon the other. These granite masses, large or small, had a plant and animal life of their own. Every phase of life was more abundant in and around these granite ranges and outcrops, a fact due, there is little doubt, to the presence of many rock-holes, which have such fine catchments that a few points of rain falling on acres of bare rock soon filled up the basin-like holes in the solid rocks.

It can be easily understood that, owing to the prolonged drought (this country being without rain for quite nine years—that is, rain to make a creek run), the collections in all branches were not nearly as large or varied as they would be in, or after, a wet season. Collecting was carried out under great difficulties. All things taken into consideration, the work accomplished was, however, most satisfactory. The country collected over was entirely a new one, and I have the honour of being the first to make an ornithological reconnaissance of the far north-west. Some idea of the result may be formed from the following list of birds, with a few brief notes on each. The whole of my work will be published later by the Royal Society of South Australia. The list of birds, which is less than one hundred species, may be considered few after travelling considerably over 1,000 miles, but the class of country and climate must be taken into consideration. I cannot speak too highly of my assistant and collector, Mr. J. P. Rogers, who was most painstaking and loyal under very trying circumstances.

BIRDS OBSERVED DURING THE EXPEDITION.

***Dromiceius n. novæhollandiæ* *** (*Dromaius novæ-hollandiæ*). Emu.—The bird was not actually seen, but many tracks and feathers were met with, and the natives had a quantity of feathers for decorative purposes.

Leipoa ocellata, sub-sp. ? (*L. ocellata*). Mallee-Fowl.—One old nest was seen.

***Austroturnix v. velox* ?** (*Turnix velox*). Little Quail.—A bird answering the description was seen on several occasions.

* The nomenclature of this list is after Gregory M. Mathews, Esq., F.R.S.E., "A List of the Birds of Australia," 1913. The R.A.O.U. "Check-list" name is given in parentheses.

Stictopeleia c. cuneata (*Geopelia cuneata*). Eastern Spotted-shouldered Dove.—Not met with beyond 100 miles west of Oodnadatta.

Phaps c. chalcopetra (*P. chalcopetra*). Bronze-winged Pigeon.—Met with near rock-holes; not numerous.

Lophophaps plumifera leucogaster (*L. leucogaster*). White-bellied Plumed-Pigeon.—Met with in the Musgrave Ranges. Very plentiful in the Everard Ranges.

Ocyphaps l. lophotes (*O. lophotes*). Crested Pigeon.—Fairly plentiful in places, but only where the waters would last some time.

Poliocephalus p. poliocephalus (*Podiceps poliocephalus*). Hoary-headed Grebe.—One or two birds seen in large water-holes on the Macumba Creek, 80 miles west of Oodnadatta.

Lobibyx novæhollandiæ (*Lobivanellus lobatus*). Spur-winged Plover.—The call of this bird was heard on one or two occasions at night; it may be they were travelling.

Elseya m. melanops (*Ægialitis nigrifrons*). Black-fronted Dottrel.—An odd bird or two met with near water-holes up to 80 miles west of Oodnadatta, but not after that.

Peltohyas australis (*Eudromias australis*). Australian Dottrel.—A small party met with on stony table-lands.

Burhinus m. magnirostris (*Edicnemus grallarius*). Heard calling at night once or twice.

Austrotis a. australis (*Choriotis australis*). Australian Bustard.—A few seen; not numerous.

Notophox novæhollandiæ (*N. novæ-hollandiæ*). White-fronted Heron.—Met with along the few water-holes on the Macumba Creek up to 80 miles west of Oodnadatta.

——— (*Nettion gibberifrons*). Grey Teal.—Notes on preceding species will answer for this bird also.

Accipiter c. cirrocephalus (*A. torquatus*).—Collared Sparrow-Hawk.—Rare; not often seen.

Uroaëtus a. audax (*U. audax*). Wedge-tailed Eagle.—Not plentiful; only one or two seen.

Haliastur sphenurus (*H. sphenurus*). Whistling-Eagle.—Only met with along the Macumba Creek.

Falco l. longipennis (*Falco lunulatus*). Little Falcon.—Not often met with.

Falco hypoleucus (*F. hypoleucus*). Grey Falcon.—Only one pair seen, near Oodnadatta.

Ieracidea b. berigora (*Hieracidea berigora*). Brown Hawk.—A common bird; met with all through the journey.

Cerchneis c. cenchroides (*C. cenchroides*). Nankeen Kestrel.—Thinly distributed all through the country.

Spiloglaux b. boobook (*Ninox boobook*). Boobook Owl.—Not numerous; specimens collected show a great deal of white on forehead.

Eolophus r. roseicapillus (*Cacatua roseicapilla*). Rose-breasted Cockatoo.—Plentiful round Oodnadatta, but not seen out west.

Leptolophus a. auricomis (*Calopsitta novæ-hollandiæ*). Cockatoo-Parrot.—One or two small flocks were observed.

Barnardius zonarius, sub-sp. ? (*B. zonarius*). Yellow-banded Parrot.—This is the same sub-species which is found from Oodnadatta to the Macdonnell Ranges.

Psephotus varius rosinæ (*P. multicolor*). Southern Many-coloured Parrot.—A very common bird wherever water was found.

Neopsephotus bourkii (*Euphema bourkii*).—Not plentiful. Came in to water very late at night, up to 9 o'clock.

Melopsittacus u. undulatus (*M. undulatus*). Warbling Grass-Parrot.—Only met with on Tietkins Creek.

Podargus strigoides, sub-sp. ? (*P. strigoides*). Tawny Frogmouth.—Not plentiful ; nesting.

Ægotheles c. cristata (*Ægotheles novæ-hollandiæ*). Owlet Nightjar.—Only one bird was seen.

Cyanaleyon p. pyrrhopygius (*Halcyon pyrrhopygius*). Red-backed Kingfisher.—A common bird.

Heterosceus p. pallidus (*Cuculus pallidus*). Pallid Cuckoo.—Not plentiful. The specimens taken show a great deal of rufous colouration on the backs of the females.

Owenavis o. osculans (*Mesocalius osculans*). Black-eared Cuckoo.—Quite a number of these birds were met with.

Neochalcites basalis, sub-sp. ? (*Chalcococcyx basalis*). Narrow-billed Bronze-Cuckoo.—Only one bird came under notice.

Hirundo n. neoxena (*H. neoxena*). Welcome Swallow.—Not plentiful ; a few birds were seen in the ranges.

Cheramœca leucosternum stonei (*C. leucosternum*). Black-and-White Swallow.—Met with all through the trip.

Whiteornis g. goodenovii (*Petroica goodenovii*). Southern Red-capped Robin.—A very common bird all over the country. Just as many specimens showed red feathers on the throat as there were without them.

Melanodryas cucullata vigorsi (*M. bicolor*). Southern Hooded Robin.—A very widely distributed bird.

Smicrornis brevirostris flavescens (*S. flavescens*). Yellow-tinted Tree-Tit.—A very common bird along all the water-courses where timber grew.

Ethelornis culicivorus musgravi (*Gerygone*).—Mr. Mathews has just described this bird as above.* The very sweet note of this bird was heard in the thick mulga near the Musgrave Ranges. More material is required for comparison with specimens collected.

Lewinornis rufiventris inornatus (*Pachycephala rufiventris*). Southern Rufous-breasted Thickhead.—This bird is consistently very light in colouration.

Leucocircæ t. tricolor (*Rhipidura motacilloides*). Black-and-White Fantail.—Found everywhere, but not in numbers.

Pteropodocys m. maxima (*P. phasianella*). Ground Cuckoo-Shrike.—Only met with at water 80 miles west of Oodnadatta.

* *Austral Avian Record*, vol. ii., No. 7, p. 130.

Coracina novæhollandiæ melanops (*Graucalus melanops*). Black-faced Cuckoo-Shrike.—A common bird all through the country.

Lalage t. tricolor (*Campephaga humeralis*). White-shouldered Caterpillar-eater.—Plentiful, but none had regained their summer plumage. They appeared to be migrating.

Cinclosoma c. castanotum (*C. castanotum*). Chestnut-backed Ground-Bird.—Not plentiful; only met with in the sand-hill country.

Samuela cinnamomea (*Cinclosoma cinnamomeum*). Cinnamon Ground-Bird.—Rather plentiful on the stony table-lands.

Morganornis s. superciliosus (*Pomatorhinus superciliosus*). White-browed Babbler.—Found all over the country; a very widely distributed bird.

Calamanthus campestris isabellinus (*C. isabellinus*). Desert Wren.—Not a common bird; found only in the salt-bush country.

Ptenœdus mathewsi vigorsi (*Cinclorhampus rufescens*). Eastern Rufous Song-Lark.—Only one specimen secured, which was silent.

Parephthianura t. tricolor (*Ephthianura tricolor*). Tricolored Chat.—Fairly plentiful; seemed to be migrating. Found in open bush country.

Aurephthianura a. aurifrons (*Ephthianura aurifrons*). Orange-fronted Chat.—Not so plentiful as the Tricolored Chat. It frequented open salt-bush plains.

Ashbyia lovensis (*A. lovensis*). Desert Bush-Chat.—Met with 60 miles west of Oodnadatta. Its actions and habits are more like those of Pipits than those of Chats.

Acanthiza pusilla consobrina (*A. pyrrhopygia*). Pale Red-rumped Tit.—Met with in many localities, but not nearly so numerous as *A. uropygialis condor*.

Acanthiza marianæ. Everard Range Tit.*—This new *Acanthiza* was not met with till we had entered the granite country of the Musgrave and Everard Ranges. It was then found to be fairly plentiful in the dense mulga scrubs which cover a vast area around the above-named ranges. The upper surface of this bird harmonizes most wonderfully with the bark of the mulga trees; it would be very difficult, especially from overhead, for a bird of prey to pick out this little bird when sitting on the blue-grey bark of the mulga. In some instances this was the only bird to be found in these dense, waterless solitudes. It uttered a feeble call—a kind of chirrup—and I did not hear it at any time utter the pleasing little song which other members of the genus do at times. The great dryness and solitude seem to affect these little birds as they do other animals. Although this species resembles *A. uropygialis condora* somewhat in size and colouration of under surface, yet the bill is thicker and of quite a different shape, and the blue-grey of the upper surface is unlike any other member of the genus in Australia. It seems to spend most of its time hopping about silently amongst the lower mulga branches, which its colouration so resembles, and peering into every crack and corner in search of moths and spiders, which must be drink as well as food. I have had much pleasure in naming this bird in honour of Mrs. Gregory M. Mathews, of England.

* White, S. A., *South Australian Ornithologist*, vol. ii., No. 2, 1915.

Acanthiza uropygialis condora (*A. uropygialis*). Pale Chestnut-rumped Tit.—Very plentiful all through the country.

Acanthiza iredalei morgani (———). Southern Thin-billed Tit.—A rare bird, seldom seen.

Geobasileus chrysorrhoa addendus (*A. chrysorrhoa*). Port Augusta Yellow-rumped Tit.—Fairly abundant, moving about in small flocks.

Pyrrholaemus b. brunneus (*P. brunneus*). Redthroat.—In many localities it was very plentiful; it seemed to frequent low scrub on the western or south-western sides of the ranges.

Malurus melanotus callainus (*M. callainus*). Turquoise Wren.—I have placed a bird of this genus under the above heading because it resembles that sub-species most, yet it has not the same shade of blue upon the head or mantle, but comes between *M. callainus* and *M. whitei*, approaching the first-named more closely. This bird was found all over the country visited, but one could not say in any numbers.

Hallornis c. cyanotus (*Malurus cyanotus*). White-winged Wren.—Found wherever low bush or salt-bush grew.

Diaphorillas textilis purnelli * (*Amytornis textilis*). Buff-throated Grass-Wren.—This bird was rather numerous amongst the porcupine-grass (*Triodia*) on the sides of both the Musgrave and Everard Ranges, but it was very difficult to approach.

Eyramytis, sp. ? Grass-Wren.—This bird mostly resembles *E. goyderi*, but has a thicker bill and is much darker on the upper surface, and the flanks are rich reddish-brown.

Campbellornis personatus munna (*Artamus personatus*). Masked Wood-Swallow.—Met with migrating south.

Campbellornis s. superciliosus (*Artamus superciliosus*). White-browed Wood-Swallow.—These birds were travelling south with *C. p. munna*.

Austrartamus m. melanops (*Artamus melanops*). Black-faced Wood-Swallow.—Not nearly so plentiful as they are farther south.

Colluricincla rufiventris whitei (*C. rufiventris*). Southern Buff-bellied Shrike-Thrush.—Scattered thinly all over the country.

Grallina c. cyanoleuca (*G. picata*). Magpie-Lark.—Found along the Macumba Creek near water-holes, but they were not seen in the Musgrave or Everard Ranges.

Cracticus nigrogularis mellori (*C. nigrogularis*). Southern Black-throated Butcher-Bird.—A few met with along the dry water-courses, but the bird was not numerous.

Oreoica cristata clelandi (*O. cristata*). Crested Bell-Bird.—Found all through the country, but never in numbers.

Aphelocephala castaneiventris whitei † (*A. leucopsis*). Whiteface.—This sub-species, which we discovered the year previous to this expedition, was very plentiful all through the country.

Aphelocephala p. pectoralis (*A. pectoralis*). Chestnut-breasted Whiteface.—The re-discovery of this bird, which has not been seen

* Mathews, *A. A. Record*, vol. ii., No. 5, p. 99.

† *A. A. Record*, vol. ii., No. 5.

for so many years, is of great ornithological importance. John Gould described it from a single specimen in 1871. Strange to say, during our Central trip in 1913 we did not see a trace of this bird, although *A. nigricincta* was met with in numbers. Ornithologists in South Australia have been on the look-out for this bird for many years past without obtaining any trace of it. On this expedition we met with this species in small flocks the third day out from Oodnadatta in a westerly line. They were hopping about on the stony ground in search of seeds. When alarmed they flew into a bush (if one was near), then off to some little distance. Alighting upon the ground, they moved about very quickly. On the wing they generally kept up a twittering note. I have already (*Transactions Roy. Soc. of S.A.*, vol. xxxviii., 1914) mentioned that *A. nigricincta* makes a weaker and more plaintive call than *A. castaneiventris whitei* or *A. l. leucopsis*. I now find that this bird has a still softer and weaker call in comparison with *A. nigricincta*. A good series of these birds was collected—adult males and females as well as immature birds. A few showers of rain fell on part of the country several weeks previous to our visit, and these birds had nested and brought up their young, for they had quite a number with them. In some cases the young birds had a few dark spots appearing in the faint buff band, which makes me think that this species and *A. nigricincta* interbreed. It has been put forward that *A. pectoralis* is the immature form of *A. nigricincta*.* I am sure this is not the case, because I am positive I skinned adult males and females and the young birds, and, strange to say, the younger the bird the more numerous the dark spots are on the band. In 1913, during our Central Australian expedition, we found *A. nigricincta* nesting in numbers, but never a sign of a bird with a chestnut band.

***Aphelocephala n. nigricincta* (*A. nigricincta*).** Black-banded White-face.—Fairly numerous on the table-land country, and often found in company with *A. pectoralis*.

***Sphenostoma cristatum pallidum* (*S. cristatum*).** Pale Wedgebill.—Thinly scattered over the country. Those found near the Musgrave Ranges are of an exceptionally light colour.

***Neositta pileata tenuirostris* (*N. tenuirostris*).** Slender-billed Tree-runner.—Occasionally met with in the mulga.

***Climacteris erythroptus superciliosa* (*C. superciliosa*).** White-browed Tree-creeper.—Rather plentiful in some localities.

***Austrodiæum h. hirundinaceum* (*Dicæum hirundinaceum*).** Mistletoe-bird.—Not a common bird.

***Pardalotus rubricatus pallidus* ? (*P. pallidus*).** Pale Red-browed Pardalote.—Met with in the big timber (*Eucalyptus rostrata*) along the dry water-courses.

***Pardalotinus striatus finkei* † (*Pardalotus striatus*).** Central Australian Pardalote.—Not a common bird.

***Glyciphila albifrons incerta* (*Glyciphila albifrons*).** Eastern White-fronted Honey-eater.—Quite numerous in some localities, especially where the flowering *Eremophila* (sp. ?) grew.

* *A. A. Record*, vol. ii., No. 7, p. 131.

† *A. A. Record*, vol. ii., No. 5.

Certhionyx variegatus (*Lichnotentha picata*). Pied Honey-eater.—Rare ; a few birds seen amongst the granite outcrops.

Meliphaga s. sonora (*Ptilotis sonora*). Singing Honey-eater.—Very numerous all through the country.

Lichenostomus keartlandi, sub-sp. ? (*Ptilotis keartlandi*). Grey-headed Honey-eater.—Fairly numerous in the ranges. The whole of the plumage, especially the yellow on breast and throat, is much brighter than that of the birds from the type locality.

Lichenostomus plumulus ethelæ (*Ptilotis plumula*). Southern Yellow-fronted Honey-eater.—Numerous in some localities.

Ptilotula penicillata leilavalensis (*Ptilotis leilavalensis*). Cloncurry White-plumed Honey-eater.—Plentiful. This bird shows a dark line beside the ear coverts ; North's bird does not show any dark, I believe.

Myzantha f. flavigula (*M. flavigula*). Yellow-throated Miner.—A common bird along the dry water-courses.

Acanthogenys rufogularis cygnus (*A. rufigularis*). Southern Spiny-cheeked Honey-eater.—Plentiful wherever flowering shrubs were found.

Anthus a. australis (*A. australis*). Australian Pipit.—Thinly distributed over the country.

Tæniopygia c. castanotis (*T. castanotis*). Chestnut-eared Finch.—Wherever there was water these birds were found in great numbers.

Emblema picta ethelæ * (*E. picta*). Painted Finch.—Very rare ; only found in the deep gorges of the Musgrave Ranges.

Chlamydera maculata macedonelli ? (*C. maculata*). Yellow-spotted Bower-Bird.—Very shy ; only one or two birds seen, confined to the ranges.

Corvus coronoides perplexus ? (*C. coronoides*). Southern Raven.—I am completely puzzled by these birds. Skins were collected with white basal half to feathers, while others had them almost black. The majority had white eyes ; a few had hazel or light brown eyes.

Neostrepera, sp. ? (*Strepera*, sp. ?)—This bird comes between *N. versicolor intermedia* and *N. v. plumbea*, being lighter in plumage than the first-named and much darker than *N. v. plumbea*. The bird is much larger than that of either of these sub-species. Found in the Everard Range, where it was very rare and shy.

Treasurer's Note.—Members who have not yet paid their annual subscriptions are reminded that the hon. treasurer (Mr. Z. Gray, 190 Bridport-street, South Melbourne) will be glad to receive them at once, so that the year's accounts may be satisfactorily squared up.

Notes on the Genus *Pycnoptilus*.

By F. E. HOWE, C.M.Z.S.

(Read before the Bird Observers' Club, 18th February, 1915.)

THE Pilot-Bird (*Pycnoptilus floccosus*) was twice described by John Gould in "The Proceedings of the Zoological Society of London." Appended are his descriptions:—

PYCNOPTILUS FLOCCOSA.*

From New South Wales to the country towards the River Darling.

Genus *Pycnoptilus*.

Bill much shorter than the head; gonys and culmen gradually descending; upper mandible notched at the tip; nostrils covered with a distinct operculum; base of the bill beset with very fine, feeble hairs; wings very short, round, and concave, the sixth primary the longest; tail short, rounded, feathers very broad and of a soft texture; tarsi strong and somewhat lengthened compared with the size of the bird; hind toe strong, and armed with a rather long claw; fore toes and nails rather feeble, the outer and inner toes of equal length; plumage dense, lengthened and silky, especially on the flanks.

PYCNOPTILUS FLOCCOSUS.

All the upper surface, wings, and tail rich brown; throat and breast sandy-buff, the feathers of the latter with a crescent of brown near the tip; remainder of the under surface brown, approaching to white on the centre of the abdomen; under tail coverts rusty-red; bill and feet dark brown.

Total length, $6\frac{3}{4}$ inches; bill, $\frac{5}{8}$ inch; wing, $2\frac{3}{4}$ inches; tail, $2\frac{3}{4}$ inches; tarsi, $1\frac{1}{4}$ inches.

Habitat.—New South Wales.

Remark.—Received in a collection made on the upper part of the River Murrumbidgee.

This form is somewhat allied to *Hylacola*, *Atrichia*, and *Dasyornis*, but differs from all these genera in several particulars.

GENUS *PYCNOPTILUS*.†

General Characters.

Bill shorter than the head, slightly notched at the tip; culmen inclining downwards; nostrils basal, rather large, and partially covered with an operculum; base of the bill beset with a few fine bristles; wings short, very concave, round in form, the first quill very short, the second, third, fourth, and fifth gradually increasing in length, the sixth, seventh, eighth, and ninth equal and the longest; tail moderately long, rounded, the feathers soft and yielding; tarsi considerably longer than the toes; hind toe strong, lateral toes equal; plumage dense and silky.

PYCNOPTILUS FLOCCOSUS.

General plumage brown, inclining to rufous on the lower part of the back, upper tail coverts, and tail; forehead, lores, throat, and breast dark reddish-buff, with a very narrow crescent of dark brown at the tip of each feather; centre of the abdomen greyish-brown, crossed by crescentic bands of black; flanks and vent brown, passing into deep rufous on the under tail coverts; bill brown; base of the under mandible fleshy-brown; legs and feet fleshy-brown.

* "Proceedings Zoological Society," 1850, p. 95.

† "Proceedings Zoological Society," 1850, p. 279.



Nest of Pilot-Bird, Ferntree Gully, Victoria.

FROM A PHOTO. BY H. A. PURNELL.

Total length, 7 inches; bill, $\frac{5}{8}$ inch; wing, $2\frac{3}{4}$ inches; tail, 3 inches; tarsi, $1\frac{1}{8}$ inches.

Habitat.—Interior of New South Wales

This form is an inhabitant of eastern Victoria and south-eastern New South Wales. Its most southerly range is Wilson's Promontory (Vic.), and, in a westerly direction, I heard the birds at Whittlesea (Vic.) Mr. A. J. North, in his "Nests and Eggs of Birds Found Breeding in Australia,"* mentions that Mr. Robert Grant secured some birds at Lithgow, on the Blue Mountains (N.S.W.), in 1878, and adds:—"He also met with this species in a deep gorge between Wallerawang and Mudgee, the northern limit of its known range."

Mr. G. M. Mathews described, from a skin obtained at Sassafras (Vic.), *Pycnoptilus floccosus sandlandi* as sub-specifically distinct from the bird from the type locality (N.S.W.)† In answer to a question of mine he said:—"On account of its much darker coloration above and below, the head and back being especially different, *P. f. sandlandi* lacking the fawn colour of the New South Wales bird."

Two skins of *P. f. floccosus*, collected by Mr. Grant at Lithgow in July, 1888, and loaned to me by Mr. H. L. White, of Scone, New South Wales, and two skins of *P. f. sandlandi*, collected for me at Selby, Victoria, during October, 1914, by Mr. T. H. Tregellas, are exhibited, and I append a description of the Victorian form, showing its differences, and proving that there was justification for separating the birds.

The general colour of *P. f. sandlandi* above is much darker than that of the New South Wales form, which is more rufous, especially on the rump and tail feathers. The under surface of the Victorian bird is also much darker generally, but along the abdomen to the vent the colour is snowy-white; a very dingy shade of light fawn characterizes the New South Wales species. The bill and feet of *P. f. sandlandi* are black, whereas in *P. f. floccosus* they are light rufous. The under tail coverts are dark rufous in *P. f. sandlandi*, and in *P. f. floccosus* bright rufous. The New South Wales bird, apart from being much brighter generally in colour, appears to be smaller than our Victorian form, the smaller specimen of *P. f. sandlandi* exhibited being much larger than either of the specimens of *P. f. floccosus*.

I first met the Pilot-Bird at Ferntree Gully, in the Dandenong Ranges, Victoria, on 18th November, 1906. My friend, Mr. J. A. Ross, had been fortunate enough to find a nest containing two eggs on the previous day. We decided to have a good look for the birds. I might here say that for the past eight years we have spent many week-ends studying the nesting economy of Pilot-Birds, and have made many interesting observations. Why the species is called Pilot-Bird I have not been able to ascertain, although I have made exhaustive inquiry. One

* "Nests and Eggs," North, vol. i., p. 310.

† "Novitates Zoologicae," vol. xviii., p. 331 (1912).

observer says that, as the pilot-fish is always found in the company of a shark, so the *Pycnoptilus* is always to be found where there are Lyre-Birds (*Menura*). Certain it is that, wherever I met the Pilot-Bird, the Lyre-Bird, though seldom seen, was always to be heard.

The Pilot-Bird is terrestrial in habit, and only on one or two occasions have we observed it at any height from the ground. When we were examining a nest once the birds came, and, flying and climbing into an Acacia, reached a height of perhaps 12 feet. Sometimes I have seen them fly from the ground 5 or 6 feet into the air after moths.

The *Pycnoptilus* is found only in the dense and humid scrubs of secluded gullies, particularly country covered with huge sword-grass (*Lepidosperma*) and wire-grasses (*Ehrharta*). It is also partial to large tracts of hop (*Goodenia ovata*) and bracken fern, but these scrubs must be covered with a larger and taller growth of eucalyptus, or hazel and musk. The bird has greatly developed its legs at the expense of the wings. Its food is almost entirely obtained on the ground, and it covers much country in search of it. Moreover, the bird will fly only when forced to, as, for instance, when crossing a track or open part in the scrub, or if alarmed, and even then it flies only a short distance, trusting rather to its legs for safety. Its dexterity in getting through the scrub is marvellous, and it often goes at such a pace that it resembles a small-sized rat more than a bird. In its nidification, habits, and plumage the Pilot-Bird perhaps resembles *Hylacola pyrrhopygia* more than any other form, and is closely allied to the Scrub-Wren, *Sericornis frontalis* (*Sericornis longirostris longirostris*), but is considerably larger. The Pilot-Bird is insectivorous, but occasionally varies its food. The contents of the stomachs of a few birds were examined by Mr. T. H. Tregellas. He tells me that in the majority of cases they were crammed with minute mussels, taken from banks of water-courses, and the bodies of small green beetles. The birds are also fond of the fruits of *Bursaria spinosa*. Often I have seen them devour worms, and a pretty sight it was to see a bird perch on my companion's foot and take mosquitoes. Often when eating lunch we have fed Pilot-Birds with bread crumbs, and on one occasion a bird allowed a serviette to be shaken over it without showing any sign of fear. When in quest of food these birds have a strange habit of "flicking" the tail with a smart up-and-down motion, and often use their feet to turn over bark and leaves. Their actions generally are very dainty.

The song of *Pycnoptilus* is sweet and varied. There are at least half a dozen different calls, the female generally joining in at the latter end of the song with notes entirely different from those of the male, just as the female of the Coachwhip-Bird, *Psophodes crepitans* (*P. olivaceus scrymgeouri*) does. One note, sounding like "Tui-wit" softly uttered, is often heard when the nest is building, and is used by both birds. The description of



Pilot-Bird and Young.

FROM A PHOTO. BY A. H. E. MATTINGLEY.



Pilot-Bird Approaching Nest.

FROM A PHOTO BY A. H. E. MATTINGLEY.

a call given by A. J. Campbell* as "Guinea-a-week" is easily recognized, and is generally given by the female in answer to a longer and more beautiful song, and appears to be used when the birds are moving rapidly through the scrub. When the female is sitting the male uses the "Guinea-a-week" call, and she answers from the nest, "Whit-a whit-ee." Should the female come off the nest without being called, the song then is either "Guinea-a-week tui," "Guinea-a-week tui," or "Whit-a-whit-ee tou," "Whit-a-whit-ee tou," the last syllable being uttered by the male in both cases. Often the male will fly on to a fallen dead tree and give voice; then the head is thrown rearward, so much so that it appears to be resting on the back, and the little throat can be seen working even when the observer is at a fair distance. The Pilot-Bird rarely calls when motionless, but always when running along a log or just after perching on a fallen limb. I do not know of any bird notes that are as beautiful as those of this silver-throated songster. They come with such piercing sweetness, and from its volume one would think that the song was uttered by a much larger bird. When the birds are excited they have the power of "fanning" the tail and also of raising the feathers on the crown and the nape.

The birds are local to an extraordinary degree, and whenever we located birds many old nests would be found within a radius of perhaps a few hundred yards. Even when we disturbed them and took the eggs they rarely moved more than 200 yards away.

The breeding season extends over seven months, and eggs have been seen as early as 22nd August (1907), and as late as 10th February (1907). Two, or perhaps three, broods are reared. The birds act as foster-parents to the young of the Fan-tailed Cuckoo, *Cacomantis flabelliformis* (*C. rubricatus rubricatus*), and both young and eggs of this species have been seen in the nest. The female alone builds the nest, which is a compact, domed structure, about 6½ inches in diameter generally, but specimens have been seen considerably larger, and occasionally smaller. The nest is composed of large strips of bark outwardly, with a finer layer of bark and finally a lining of grasses, and the bottom is generally lined with feathers, most of them being the silky feathers from the bird's own flanks. The sites for the nests vary. Often they are built in sword-grass, in the banks of a grassy wall or gutter, often under a fallen dead branch, and occasionally flat on the ground without any cover whatever, and never more than 2 feet above the earth. The opening of the nest is in the side, rather near the top; the nest is deep inside. At the opening appears a "landing stage," sometimes as long as 8 or 10 inches, made of small sticks or sword-grass stems. Often the outside of the nest is decorated with dead eucalyptus leaves. This applies to nests built into the scrub, but when placed in *débris* the outer covering is bark, with small dead sticks above.

* "Nests and Eggs," Campbell, p. 260.

Most of the nests are practically miniature Lyre-Birds' nests, but another type is distinguished from that of *Sericornis frontalis* only by its larger size. The nest of the Pilot-Bird is one of the most difficult to find, and usually the opening is the first thing to catch the eye. The female builds the nest with wonderful rapidity, generally completing it in from a day and a half to two days, and the eggs are laid about a week later.

I was fortunate enough to see a bird start her nest early one morning. She had selected a small isolated bit of sword-grass on the bank of a dry creek. Hearing the birds calling frequently and excitedly, I crept down a fallen dead tree. The first thing I saw was a female literally throwing herself into the grass, turning round and round, and using her wings vigorously. She soon had a fair-sized opening. By the evening the nest was nearly finished, only the lining being needed. Another nest was found building at 8.30 a.m., there being merely a few leaves noticeable in the space that had already been fashioned in the sword-grass; at 4.30 p.m. the nest was nearly finished. With nests built on the ground it was noticed that small holes had been scooped in the earth to receive them. Two eggs form a clutch, and, although one authority gives the complement as from two to three, I am inclined to think that one egg, where there were two, would belong to a Cuckoo. The eggs are very beautiful, resembling ripe acorns. They are generally of a uniform dark chocolate, with an indistinct zone, but the colour varies to light chocolate and olive-green. I have seen specimens that were almost grey, with indistinct bands encircling the whole shell. One pair of birds always laid eggs typical of those of the Rufous-breasted Thickhead, *Pachycephala rufiventris* (*Lewinornis r. rufiventris*), and, of another clutch, one is typical and the other more like a very large specimen of the egg of *Sericornis frontalis* (*S. l. longirostris*). Other specimens are faintly spotted with dark umber or purple, appearing to be beneath the surface of the shell. Occasionally eggs have black, hair-like markings, and these are easily removed. Another very beautiful type is zoned or belted as if owing to a lack of pigment, and when held up to the light is transparent. These eggs are very brittle, and have the appearance of being cracked all over; the surface is rather glossy, and the texture very fine indeed. An average clutch, in inches, measures—(1) 1.06 x .76, (2) 1.05 x .77.*

Incubation, which is carried out by the female alone, lasts about 16 days. During the first few days the female does not sit close, but will flush from the nest at the first approach of danger. She comes off more often to feed, and sometimes is absent for a few hours; but as incubation proceeds she is more reluctant to leave the nest, and it is very hard to flush her. To find the nest our usual procedure was to separate in the scrub and wait for the call of the male. If the day was very warm we often waited for

* "Nests and Eggs," Campbell, p. 258.



Nest and Eggs of Pilot-Bird.

FROM A PHOTO. BY T. H. TREGELLAS.



Nest of Pilot-Bird, with Egg of *Pycnoptilus* and Egg of Fan-tailed Cuckoo.

FROM A PHOTO. BY H. A. PURNELL



hours without getting a call; but if, on the other hand, the weather was cool, the calls were more frequent. It was noticeable, too, that as incubation advanced the male became more silent. Directly we got the female's answering notes we endeavoured to find her and follow the birds about until she gathered a mouthful of material preparatory to returning to the nest. This was always an exciting moment for us, as the bird lost no time, but flew and ran rapidly through the dense scrub in the direction of the nest. Often this performance had to be repeated a few times before we gradually neared the site and located the nest; then we would beat a hasty retreat for fear the birds would desert their home. If the female were already sitting, we had recourse to other expedients to help us. The female never returns to the nest, after coming off to feed, without taking back a bit of lining in the shape of a feather or piece of fur, so we resorted to deceptive measures. We took small tins full of the white, fluffy feathers of the domestic Leghorn fowl, and placed a few in the scrub and along the tops of fallen logs in the direction of the place from which the bird called, and she was discovered; the rest was comparatively easy. It was a pretty sight, the female carrying a large white downy feather, and making through the scrub on her way to the nest. When she settled in it the feather completely blocked the nest opening.

On 14th December, 1913, Mr. H. A. Purnell, of Geelong, at my invitation, came to try to secure a photograph of the nest and eggs of the Pilot-Bird, and he succeeded. Now, as the bird always takes something back to the nest, it is logical to suppose that she brings it out with her. On Mr. Purnell's last trip, 8th November, 1914, we experienced difficulty in finding a nest that we knew must contain eggs. We had hunted over every likely-looking spot in a radius of perhaps 100 yards. Every time the female called from the same direction, a spot that we had marked down as very close to a huge white gum tree growing well up the hillside. Finally, we sat down to await events. This waiting had gone on for perhaps half an hour when one of the party began to mimic the call of the male Pilot-Bird. Almost immediately a female answered, and presently rose from a spot not more than 7 yards from us. Standing on a stick, she answered the male, who called in response to her first notes. The nest of this pair was cleverly hidden. When the female leaves the nest to feed she generally selects a small stick on which to perch to preen and "fluff" the feathers, and then, uttering her call, is joined by her mate. On the 8th November we were following two Pilot-Birds that were nest-building when rain began to fall, and soon the undergrowth and sapling suckers were saturated. It was an amusing sight to watch the birds take a bath. This they did by flying into the thickest parts of the sapling suckers. Flapping the wings and raising the feathers all over the body, they were soon wet. All the while they whistled and chattered with evident enjoyment.

The young are born blind and nearly naked. Dark grey down is distributed sparingly on the crown and the back. The gape is yellow, and the inside of the mouth orange. On about the fifth day the eyes open (the irides are black or very dark brown). When the chick is about a week old the feathers are well developed, and those along the abdomen (which at birth was naked) are white and well defined, the primaries are half unfurled, the gape is creamy-white, and the mouth yellow; general colour above, dark brown. On 15th November, 1908, we disturbed a pair of birds with their young, and, after an exciting chase, managed to capture one of the fledgelings. It was apparently about six weeks old. The gape was still of a whitish colour, and the general plumage was practically identical with that of the parents. When the young bird is about three months old the gape assumes a greyish hue, and adult plumage is doubtless attained after the first moult. The wing feathers are moulted in pairs. Both parent birds feed the young while they are in the nest, and for a considerable time afterward. The young follow their parents, uttering a soft, wheezing note, an appeal for food, which is taken from the side of the parent's bill. When the young are in the nest the food is dropped into the open beak. Often, when watching the young after they had learned to shift for themselves, I have heard them utter the "Guinea-a-week" and other notes, but so low as not to be heard further than a few paces away. On 12th January, 1908, I flushed a female from a pair of dark grey eggs, and the male was attending to the wants of two birds a few months old close by. On 11th December, 1910, we saw a young bird, well fledged, being fed by an adult male. In colour the fledgeling resembled the young of *Pachycephala pectoralis youngi*, being of a uniform light fawn.

As already mentioned, the *Pycnoptilus* acts as foster-parent to the Fan-tailed Cuckoo. One of the strangest cases is worth recording. On 4th November, 1914, we followed a pair of Pilot-Birds about until the female had gathered a beakful of fur. Separating from the male, she made off uphill, with three of us in pursuit. The nest was built on a small piece of sword-grass backed up against a fallen dead tree, and facing downhill. As she sat close we flushed the bird, anticipating a pair of eggs; but there was only one, and we concluded that the second egg had yet to be laid. A week later we again visited this nest, and were surprised to find that the egg had disappeared. The ground sloped from the nest, and about 7 feet away appeared a small gutter, and over this was a clear patch of bare earth about 18 inches square. Just as we were turning away one of the party happened to glance at this bare patch, and there, lying close to each other, were two eggs of the Pilot-Bird, intact. They were perfectly fresh. Of course, we at once blamed a Cuckoo (or perhaps two Cuckoos), and while we were talking and wondering at this strange sight Mr. Ross found a Cuckoo's egg, broken, within a foot of the Pilot-Bird's eggs. Our deduction was that

a Cuckoo had taken an egg out of the nest before we found it, and possibly the same bird had returned for the other egg when ready to foist her own on the foster-bird, but the rightful owner had returned in the nick of time, and a fight had taken place, causing the Cuckoo's egg to be broken.

A few of the foregoing observations have been recorded by me in *The Emu*,* and some of the opinions then expressed have been modified and corrected, and, I hope, something more of the bird's economy added. In conclusion, I must state that, although bush-fires and clearing is undoubtedly driving these birds farther back into the ranges, they are still very common all through the Dandenong Mountains.

Birds of Wangaratta District, Victoria.

BY (MISS) GLADYS M. CHENEY, R.A.O.U.

IN March, 1912, I took charge of the school at Carraragarmungee, which is situated between Wangaratta and Beechworth, about five miles from the Ovens River at Tarravungee. The district consists of a plain, bordered on the east by the hills around Beechworth, on the north by a line of low hills and a valley widening out and running away to the Murray River, on the west by the Warby Ranges and Morgan's Lookout, and on the south by the Black Range and Mount Buffalo. Near the school occurs the junction of Clear Creek with Reedy Creek, where is a rushy swamp backed by a large orchard and vineyard. Following these creeks back into the hills, one finds fairly thickly timbered country, with pretty gullies and occasional waterfalls, while the scattered dwellings along them are surrounded by weeping willows and groves of *Pinus insignis*—a paradise for birds. To the west is wheat country, backed by the winding reaches of the Ovens, with pretty billabongs, wherein grow water-lilies and reeds, banked by acacias and flowering gums. One species of eucalypt is particularly beloved by the Honey-eaters and Lorikeets. Locally it is known as the wild apple, on account of the strong apple perfume of the flowers.

Growing more and more interested in bird study, I visited surrounding districts in the holidays, but found that the richest variety of bird life occurred near home—in fact, at least 140 of the birds listed were seen within two miles of the school. This may be due to the overlapping of the different areas of bird-distribution. From the north-west of Victoria we had such visitors as the Black-eared Miner, the Redthroat, the Orange-fronted Chat, and the Black-tailed Parrot, while from the central plains came the Australian Bustard and the Rose-breasted Cockatoo, from the south the imported Indian Turtle-Dove and the European Blackbird. Ten miles further away in any direc-

* *Emu*, vol. vi., pp. 183-185; vol. ix., pp. 41-43.

tion many of these migrant and nomadic birds would have been missed. Swamp and water birds were numerous. Mountain birds frequently visited the plain, while plain birds reached their southern limit on the adjacent foothills. I was exceedingly fortunate in having a band of enthusiastic helpers—my pupils—who worked early and late observing the habits of familiar birds, and the arrival and departure of those more unfamiliar. They frequently journeyed several miles to ask me to see some new species visiting the district.

Coturnix pectoralis. Stubble-Quail.—These birds were frequently surprised among the long grass in the play-ground of the school during the summer months. We found a clutch of their eggs in an old post-hole.

Synoicus australis. Brown Quail.—Very tame, and often came into the garden on a hot day.

Excalfactoria australis. King Quail.—Being both pretty and rare, this species was generally shot on sight by a certain type of "sportsman." Once examined, the bird was thrown away, and the only excuse given by the slayer was that he "wanted to see what it looked like." This spirit of perverted curiosity is responsible for the death of many different birds.

Turnix varia. Painted Quail.—Occasionally half a dozen birds were observed feeding in the paddocks along the dry water-courses. They arrived when the grasses were seeding.

Turnix velox. Little Quail.—We found one hanging by the neck in a wire-netting fence, a prey, probably, of the Collared Butcher-Bird. Another fraternized with some poultry, but, unfortunately, a cat killed it.

Pedionomus torquatus. Plain-Wanderer.—Owing to the drought, these birds did not visit the district during 1914, although in previous years we often saw them.

Turtur ferrago. Indian Turtle-Dove.—A pair of these introduced birds paid a week's visit to an orchard in September, 1914, none having previously been recorded.

Geopelia tranquilla. Ground-Dove.—When up in the hills it was delightful to hear a chorus of soft cooings high in the eucalypts; the call was taken up and repeated again and again by more distant birds, until finally it died away. A few miles away, on the plains, the birds were rarely seen. One might occasionally stay about a house for a few days.

Geopelia cuneata. Diamond Dove.—An occasional visitor to the plains. Some nested not far from the school in 1913, but during 1914 they did not leave the hills.

Phaps chalcoptera. Bronze-winged Pigeon.—These beautiful birds attract everyone, so that some people have tried to keep them in captivity. I am glad to say that they met with no success; a bird barred in a cage is a pitiful sight.

Phaps elegans. Brush Bronze-winged Pigeon.—These were more commonly seen than the preceding species.

Leucosarcia picata. Wonga-Wonga Pigeon.—Two lived in some

trees bordering a busy road, where traffic was constantly passing to a creamery near by. Quite unconcernedly, the birds began to build a nest, but after three weeks they disappeared.

Hypotaenidia philippensis. Pectoral Rail.—Along Reedy Creek these birds nested every year in the rushes, but the young constantly met with accidents from dogs. One bird sustained a broken leg, but managed to get its living comfortably, the bones knitting together somewhat.

Porzana fluminea. Australian Spotted Crake.—Twice only reported—28/11/13 and 24/3/14. They were running through the long grass in a swamp.

Porzana palustris. Australian Little Crake.—One came into a garden for a few hours.

Gallinula tenebrosa. Black Moor-Hen.—Occasionally seen along the middle reaches of the Ovens River.

Porphyrio melanotus. Bald-Coot.—These birds were often seen wading in the reedy back-waters of the Ovens.

Podiceps gularis. Black-throated Grebe.—Although a widely-spread species, many people do not know this bird, owing to its habit of diving and swimming under water. It rises quietly among some plants, where it remains almost motionless until the danger is past.

Podiceps poliocephalus. Hoary-headed Grebe.—I know of only one of these birds. It became tame, swimming about in an anabranch of the Ovens, in the Whorouly school-ground.

Lobivanellus lobatus. Spur-winged Plover.—Driving along the side roads, one disturbed numbers of these fearless birds. During the breeding season the male makes a feint of driving one away from the half-grown chicks. Their nests are very hard to find; one has almost to stumble into the little hollow on the ground before the eggs are seen. The birds do not seem afraid to hatch out their young close to a road.

Zonifer pectoralis. Black-breasted Plover.—Their incessant alarm call frightened other birds away when one was out on an excursion along the creeks. One usually saw more of this species than of the Spur-winged Plover.

Ægialitis nigrifrons. Black-fronted Dottrel.—Several pairs of this species nest along Clear Creek. Some specimens had scarlet legs and red bills. The children took a great delight in hunting for their nests in order to note the protective colouration of the eggs, which were usually somewhat like those of the Rufous-breasted Whistler's, but varied according as they were placed on yellow sand, grey earth, or on the greenish slime that grows near the creek. The birds bred very freely, which is a good sign of the care Australian children are showing for their local birds.

Himantopus leucocephalus. White-headed Stilt.—One was seen several times on the Ovens at Tarravungee last December.

Pisobia acuminata. Sharp-tailed Stint.—One or two visited the Carraragarmungee district twice a year when migrating. These were seen at the same water-hole for three successive years in March and September. In 1914 they were late, not appearing until November.

Gallinago australis. Australian Snipe.—This species appeared in

the marshes in March and September. The birds have a most peculiar soft call when surprised at night, as though they were gently whispering the alarm. It was weird to hear a company of about two dozen around one.

Œdienemus grallarius. Southern Stone-Curlew.—Frequently seen in the crops, and their mournful cry of "Wee-loo" sounded, in the winter nights, like a chorus of lost souls. There were often two or three very large sized birds among the flock. They seemed to act as sentinels, possibly being more fitted for that position on account of their extra height.

Choriotis (Eupodotis) australis. Australian Bustard.—From eight to ten years ago these birds were frequently seen. Latterly they have been very rare. A few specimens were recorded for 1913, and on 28th October, 1914, a flock was seen heading westward across the plains.

Ibis molucca. Australian White Ibis.—Two full-grown birds and three young ones stalked unconcernedly about on the Black Swamp, heedless of the passing of vehicles on the road near by. On rare occasions the birds travelled east along the creeks to the Beechworth Hills.

Carphibis spinicollis. Straw-necked Ibis.—Both common and highly valued. Last year's drought, much to the farmers' sorrow, drove it away for some months. The result was that the year proved to be one of the worst known for insect pests in the fields.

Platalea regia. Black-billed Spoonbill.—Sometimes seen in the remoter swamps.

Platibis flavipes. Yellow-billed Spoonbill.—One was seen, not long ago, in the Black Swamp. Others appear at odd times on the water-holes in the paddocks.

Mesophoyx plumifera. Plumed Egret.—One pair nested in the Pelican Lagoon; they occasionally came down to the Black Swamp.

Notophoyx novæ-hollandiæ. White-fronted Heron.—At almost every swamp or water-hole one or more of these birds might be seen rising majestically into the air. Their plumage ranged through every shade from pale lavender to dark blue. This was not a mere plumage phase, for I saw seven lavender-coloured birds of all sizes not long ago.

Notophoyx pacifica. White-necked Heron.—These birds were seldom seen, never being noticed on the roadside swamps. Towards evening I have discovered them on lonely billabongs.

Nycticorax caledonicus. Nankeen Night-Heron.—These Herons usually appear before heavy rain. The tribe of aborigines that formerly frequented the Eldorado district always moved their camps on to the high land if they saw these Herons flying about in the day-time. On several occasions I have seen three or four flying about Clear Creek before rain. They are known locally as "Cinnamon Cranes."

Botaurus pœciloptilus. Australian Bittern.—A Bittern lived at the junction of Clear and Reedy Creeks, but disappeared a little over a year ago.

Chenopsis atrata. Black Swan.—At night we heard Swans calling as they flew across, but seldom saw them for long at any pool.

***Chlamydochen jubata*.** Maned Goose.—This bird was a favourite prey for the sportsman.

***Dendrocygna arcuata*.** Whistling-Duck.—In good seasons these Ducks were common.

***Dendrocygna eytoni*.** Plumed Whistling-Duck.—More sparsely distributed than the preceding species.

***Anas superciliosa*.** Australian Black Duck.—These were the only Ducks that visited the district during the last drought.

***Nettion castaneum*.** Australian Chestnut-breasted Teal.—In normal seasons we frequently saw these birds.

***Nettion gibberifrons*.** Grey Teal.—These birds visit most of the water-holes and swamps, but 1914 was a very unfavourable year in which to observe water-fowl. The season was abnormally dry, and the birds that did appear were ruthlessly shot.

***Phalacrocorax carbo*.** Black Cormorant.—Often seen sitting motionless on logs by the river.

***Phalacrocorax sulcirostris*.** Little Black Cormorant.—Single specimens were sometimes observed.

***Phalacrocorax gouldi*.** White-breasted Cormorant.—Two or three of these birds were to be seen at nearly every pool. They remained sitting quietly on a log until one was close to them, then, very leisurely, they rose.

***Phalacrocorax melanoleucus*.** Little Pied Cormorant.—This species appeared more frequently on rivers than it did on water-holes.

***Plotus novæ-hollandiæ*.** Australian Darter.—On 30th April, 1914, Darters were seen for the first time on the Black Swamp. It was difficult to distinguish the birds when they were in repose, as the plumage harmonized well with the mud and the fallen leaves. Finding a small boat on the swamp, a Darter rested there for several hours each day.

***Circus assimilis*.** Spotted Harrier.—This bird was often seen rising from the paddocks with field mice in its talons.

***Circus gouldi*.** Allied Harrier.—Very common on the plains.

***Astur cinereus*.** Grey Goshawk.—One was seen on the Ovens Flats on 23rd March, 1914, and another was shot, "out of curiosity," at Tarrawingee.

***Astur novæ-hollandiæ*.** White Goshawk.—Once seen as we were crossing a field, 9th September, 1914.

***Astur approximans*.** Australian Goshawk.—This species was frequently seen around haystacks, looking for mice and lizards. It was very common, and was certainly responsible for the deaths of many small birds. The Red-backed Parrot, in particular, is attacked by it, specimens frequently being found with the lower beak cut completely off and the tongue pierced by the powerful hind claw of this Goshawk. It is one of the most fearless of the Hawks. We compelled a Goshawk to drop its prey just at the point of capture, and, hiding the small bird under a tree, sat down to await developments. At first the Goshawk tried to frighten us by swooping around, and, failing that, retreated to a distant tree as though giving up all idea of regaining what it had lost. After

20 minutes' waiting it sidled along a fence, where it probably thought that we could not see it. Again checked, it returned from another direction several times, until it was able to snatch the dead bird. Farmers believe that many of their losses in chicken-rearing are due to this bird. A form with a richer-coloured back may possibly be *A. cruentus*, the Lesser Goshawk.

Accipiter torquatus. Collared Sparrow-Hawk.—This bird has frequently been seen, usually flying rapidly in search of prey.

Uroaëtus audax. Wedge-tailed Eagle.—Why will people destroy these magnificent birds? They are beginning to understand that Eagles probably do not kill lambs, but they persist in shooting them "for sport." In the North-East of Victoria the Wedge-tailed Eagle is a common bird, and the children rejoice to see one on a tree in the school-ground; but, at the present rate of slaughter, there will soon be none left for anyone to admire. The birds nest near Specimen Hill.

Hieraëtus morphnoides. Little Eagle.—I had not noticed this bird until November, 1914, when it was seen rising from the same paddock day after day.

Haliastur sphenurus. Whistling-Eagle.—The most widely spread bird of prey in the North-East. It was a sight worth seeing when a flock circled in the upper air.

Elanus axillaris. Australian Black-shouldered Kite.—In the autumn this bird's note was often heard in the eucalypts; sometimes it was mistaken for that of the Black-faced Cuckoo-Shrike.

Elanus scriptus. Letter-winged Kite.—We saw this bird twice in three years.

Falco melanogenys. Black-cheeked Falcon.—More frequently met with on the hill-slopes than on the plains.

Falco lunulatus. Little Falcon.—This species also was more often a denizen of the hills.

Hieracidea berigora. Brown Hawk.—This bird usually flew about the fields in summer time. During the spring and autumn it was seen in the valleys, but in the winter we had no record of it whatsoever.

Hieracidea occidentalis. Striped Brown Hawk.—The same remarks apply to this as to the preceding species.

Cerchneis cenchroides. Nankeen Kestrel.—The remarkable hovering powers of this bird are always a subject of interest. The farmers consider that they owe a great debt to the Kestrel because of the mice it kills.

Ninox boobook. Boobook Owl.—The weird note—"Boobook"—of this species gave a great interest to the quiet bush night. Its call altered slightly with the season, in the autumn becoming somewhat higher in tone.

Ninox maculata. Spotted Owl.—This Owl was occasionally seen flying about in the half light, and resting on a branch in the day-time.

Ninox connivens. Winking Owl.—We noticed this bird a few times.

Strix delicatula. Delicate Owl.—This Owl has a variety of calls; the commonest, of "Yo yo," puzzled many people for a time. It seems like the call of a sheep-drover urging on his dogs.

Strix castanops. Chestnut-faced Owl.—Two were flying about in broad daylight on 2nd April, 1914.

Trichoglossus swainsoni. Blue Mountain Lorikeet.—A flock of these often flew screeching past the school during the flowering season of the eucalypts.

Glossopsitta concinna. Musk-Lorikeet.—This Parrot was often seen on the eucalypts in the flowering season.

Glossopsitta porphyrocephala. Purple-crowned Lorikeet.—This Lorikeet was very rare. It was once recorded in company with the Musk-Lorikeets.

Glossopsitta pusilla. Little Lorikeet.—This was the commonest of the Lorikeets, being especially numerous during January and February. During the last dry season they and many other birds attacked some of the orchards, but did little harm.

Calyptrorhynchus funereus. Black Cockatoo.—North of Myrtleford a rare species; it did not come on to the plains.

Callocephalon galeatum. Gang-Gang Cockatoo.—On two occasions flocks of Gang-Gang Cockatoos were seen flying eastwards to the ranges. On their way they fed on the berries of the African thorn: One bird, that apparently ate too freely, died very suddenly.

Cacatua galerita. White Cockatoo.—The bird-trapper is depleting the Eldorado district of these fine birds.

Cacatua leadbeateri. Pink Cockatoo.—We observed this bird in 1912 and 1913, but not subsequently.

Cacatua roseicapilla. Rose-breasted Cockatoo.—These Cockatoos are, unfortunately, too much in request as cage-birds.

Calopsitta novæ-hollandiæ. Cockatoo-Parrot.—Small flocks were common in the early autumn.

Polytelis barrabandi. Barraband Parrot.—Seen on two occasions flying about among the yellow box trees.

Polytelis melanura. Black-tailed Parrot.—One occasionally met with these Parrots along the less-frequented roads.

Aprosmictus scapulatus. King Parrot.—Flocks of from 20 to 30 King Parrots were seen, but during the winter months no full-plumaged male birds were noted. They sometimes fearlessly played about on the farm waggons.

Platycercus pennanti. Crimson Parrot.—The calls of these Parrots were heard all over the district. The birds fed much on thistle seeds. The young green forms were more common than the crimson adults.

Platycercus flaveolus. Yellow Parrot.—Before December, 1913, these birds were very rarely noted, but in that month they suddenly appeared, and for a time displaced *Platycercus pennanti* in point of numbers. The Yellow Parrot seems to have developed nomadic tendencies, remaining in a given area for only a few months at a time, and then disappearing.

Platycercus eximius. Rosella.—These birds also were very common at certain seasons, and then were not seen for some time. We had no record of a Rosella for two months in the winter.

Psephotus multicolor. Many-coloured Parrot.—Once only was this bird seen. It was flying north on a stormy day.

Psephotus hæmatonotus. Red-backed Parrot.—This, the commonest of the Parrots, constantly fell a prey to the Whistling-Eagle and the Goshawk. The usual method of attack was to drive the hind claw into the head at the angle of the jaw, so that the lower jaw was dislocated. These Parrots bred freely in low hollows in trees.

Euphema chrysostoma. Blue-winged Grass-Parrot.—A few of these birds were seen with the Red-backed Parrots on 9th April, 1914.

Melopsittacus undulatus. Warbling Grass-Parrot.—Before March, 1913, these birds had not been recorded. Then many reached the North-Eastern district, and in September, 1913, and in the same months in 1914.

Podargus strigoides. Tawny Frogmouth.—The remarkable faculty this bird possesses of hiding itself was well seen one day when we observed one flying about. Being very weak-footed, and dazed by the light, it was unable to perch, thus falling to the ground. After searching for a few minutes we found it, apparently dead, with wings outstretched and head flat on the ground. It took no notice of the sundry liftings and straightenings we gave it. Picking it up, we

Call of Podargus

Three silent Bars

More Pork' More Pork' More Pork' More Pork' More Pork'

More Pork' More Pork' More Pork' More Pork' More Pork' More Pork' More Pork' More Pork'

More Pork' More Pork' More Pork' More Pork' More Pork' More Pork'

Andante

Oom' Oom'

Boo Book' Boo Book'

ORDINARY CALL.

CALL OF BOOBOOK OWL.

started to carry it home. On the way it suddenly opened its beak and turned round with wide-open eyes. Its bearer dropped it in fear. Again it lay as though dead. I thought I would take a photograph of it as it was. Without a sound it had gone. About 20 minutes' vigorous search ensued, and it was not found until a boy went to pick up a piece of bark (as he thought); but it defied all efforts at photography.

Ægotheles novæ-hollandiæ. Owlet-Nightjar.—We seldom saw any adults of this species, but sometimes enticed young birds from the nests in the hollows.

Eurystomus pacificus. Australian Roller.—Locally, this was known as the "Rain-Bird." Sometimes its arrival was coincident with bad weather, to give colour to the saying. It was often shot and brought to me as "*probably* the only bird of its kind in Australia." Sometimes people sent in a more or less incorrect description of it to the newspapers, and there was a little excitement about it. It was fairly common, but, owing to its frequenting the tops of tall trees, not often seen, unless people heard its raucous note.

Alcyon azurea. Blue Kingfisher.—These birds are very hard to satisfy in their choice of a nest. I have known them to work at four or five nesting hollows before the final one was decided upon. Thus they often nested very late. I have not known them to use the same nest twice.

Dacelo gigas. Laughing Kingfisher.—These birds were frequently heard "laughing" heartily in the middle of the night, especially if it was moonlight.

Halcyon pyrrhopygius. Red-backed Kingfisher.—I saw one specimen only; it was near the King River.

Halcyon sanctus. Sacred Kingfisher.—It was delightful to observe a number of these birds bathing in a sunlit pool. Like the Blue Kingfishers, they made a new nest every season.

Merops ornatus. Australian Bee-eater.—In 1914 the nestlings disappeared time after time from their nests, usually when they were almost fledged. Two birds were observed making a trench along the surface of the ground when the soil was soddened by the heavy rain and the creek was flooding the cliffs. They persisted in their efforts until a domed chamber was nearly rounded at the end, and then deserted it.

Chætura caudacuta. Spine-tailed Swift.—In 1914 these birds remained until the end of April. Usually we did not see them after February. I think there must have been an unusual number of insects to keep them, they were skimming so close to the ground. Two or three were seen on the 5th November last, but the main flight did not come until December.

Cuculus pallidus. Pallid Cuckoo.—These Cuckoos usually returned to the plains in August, being the first of their family to do so. Towards November they ceased to call, and were seldom seen until about February, and then only for a few weeks. I watched one enter the nest of a Whiteface (*Aphelocephala leucopsis*) several times, but there was no egg there when I investigated. This particular Whiteface's nest was in a large hollow in a tree.

Cacomantis flabelliformis. Fan-tailed Cuckoo.—Several specimens were found lying on the ground—the jugular vein severed in each case. Fan-tailed Cuckoos usually return about the first week in September, and from thence on are found pecking caterpillars off the trees in the orchards.

Mesocorius osculans. Black-eared Cuckoo.—I saw this species twice—18th November, 1913, and 30th November, 1914; in each case the bird was picking insects off a plane tree.

Chalcococcyx basalis. Narrow-billed Bronze-Cuckoo.—This was the last of the Cuckoos to return. On 16th October, 1914, I saw some Black-and-White Fantails chasing one along the ground. It

cunningly hid in some long grass, but its enemies soon discovered it and scolded it so fiercely that it had perforce to go.

Chalcococcyx plagiatus. Bronze-Cuckoo.—The Bronze-Cuckoo's call was usually heard about the first week in August, a day or two after that of the Pallid Cuckoo. I have not found its egg in the district.

Hirundo neoxena. Welcome Swallow.—These birds I observed wintering on the Ovens River during June. Ten miles further north they were not seen until the end of September, when they returned to breed, rearing from four to five broods of young ones.

Petrochelidon nigricans. Tree-Martin.—Saw these only rarely; they were not reported for 1914.

Petrochelidon ariel. Fairy Martin.—In October the Fairy Martins began to repair their nests, and they hatched the first brood about the second week in November. There were always a few cup-shaped nests that were half-finished editions of the others.

Microeca fascians. Australian Brown Flycatcher.—Very late nesters last season, when they waited until November. We had very little rain until December, but the birds took advantage of the showers.

Petroica leggiai. Scarlet-breasted Robin.—A few pairs of these Robins remained in the orchards for the whole of the summer of 1913, bringing out their young in early December.

Petroica phœnicea. Flame-breasted Robin.—Stayed for the summer, and one pair built a nest after the rains in April, but did not have eggs.

Petroica goodenovii. Red-capped Robin.—These Robins returned from January to March. They nested in August and September, often using prickly acacias in which to build their nests. I found only one chick to the nest last season.

Melanodryas bicolor. Hooded Robin.—It is difficult to pick out these birds. They are quiet, and their markings do not stand out. They are very tame, nesting close to dwellings.

Gerygone albogularis. White-throated Fly-eater.—The pleasant little song of this species was sometimes heard in the big red gums along the river.

Gerygone culicivora. Southern Fly-eater.—I found one dead bird in August, 1914.

Falcunculus frontatus. Crested Shrike-Tit.—These birds showed very little fear of man, building nests close to dwellings, although very high in a tree-top.

Oreocra cristata. Crested Bell-Bird.—Fairly common at Chiltern, but I have known it to come further south on to the plains only once (March, 1914). One then stayed in the poultry-yard at an orchard for a week.

Pachycephala gutturalis. Golden-breasted Whistler.—Fairly well distributed.

Pachycephala rufiventris. Rufous-breasted Whistler.—I noticed a male bird taking turns with the female in sitting upon eggs. Nests were fairly plentiful in the orchards.

Pachycephala gilberti. Red-throated (Gilbert) Whistler.—Last December I found a pair of these birds near Springhurst. Their song is fuller and stronger than that of the preceding species; they also have an entirely different note.

Rhipidura albiscapa. White-shafted Fantail.—Somewhat rare visitors to the school-ground.

Rhipidura rufifrons. Rufous Fantail.—One came to our house for shelter on Christmas eve, just before a heavy thunderstorm. In February, 1914, we found a deserted nest in a vine.

Rhipidura motacilloides. Black-and-White Fantail.—Very widely spread. We had three cats that tried very hard to catch a Fantail, but they were always foiled, either by a swift movement on the part of the bird, or through fear of its scolding cry.

Seisura inquieta. Restless Flycatcher.—These birds nested along the creeks, and only paid flying visits to other parts.

Myiagra plumbea. Leaden Flycatcher.—Seen for the first time on the Ovens River in January, 1915.

Monarcha carinata. Black-faced Flycatcher.—One bird was seen near Tarrawingee on the 27th February, 1914.

Graucalus melanops. Black-faced Cuckoo-Shrike.—Frequently heard in the tree-tops, their notes being variously interpreted as "Scree-oo" and "Cherry-oh." Owing to the dry weather this season, they did not begin nesting until December.

Graucalus mentalis. Little Cuckoo-Shrike.—One specimen was seen near Wangaratta in December, 1913.

Campophaga humeralis. White-shouldered Caterpillar-eater.—Known locally as the "Garden-Bird," on account of the help rendered to orchardists in keeping down codlin moth larvæ, &c. The birds manifested a decided preference for particular haunts, returning to these year after year.

Hylacola cauta. Rufous-rumped Ground-Wren.—One specimen only was identified.

Pomatorhinus temporalis. Australian Babbler.—The incessant "Key-hole key-hole-kaw-kerry-kaw-kerry-poor-Petty" notes uttered by these birds was a good "awakener" in the morning. Their habit of working in company made them welcome visitors to the orchards.

Pomatorhinus superciliosus. White-browed Babbler.—On the plains almost unknown, on the hills very common. Their nests were small compared with those of the Grey-crowned Babbler.

Calamanthus albiloris. White-lored Field-Wren.—Nested in the reed-beds, with the Australian Reed-Warblers.

Calamanthus campestris. Field-Wren.—Very rare; seen on the granite hills around Eldorado.

Cinclorhamphus cruralis. Brown Song-Lark.—Their songs, with a harsh creaking note, heard in the crops at springtime.

Cinclorhamphus rufescens. Rufous Song-Lark.—Rarely noted.

Merula merula. Blackbird.—I saw only one of these birds—a female—in November; it was in a garden round a country house. Blackbirds have been introduced to the neighbouring Beechworth district

Oreocincla lunulata. Australian Ground-Thrush.—In good seasons this species was common in the mountain gullies, especially around the Clear Creek Falls and in the vicinity of Beechworth, but during 1914 it was not seen.

Turdus musicus. Song-Thrush.—Numbers in and around Beechworth on the road to the Buckland Gap.

Ephthianura albifrons. White-fronted Bush-Chat.—This was the only bird noticed this season that was successful in rearing its young. The nests were well hidden under fallen spear-thistles. The male shares the work of incubation.

Ephthianura tricolor. Tricoloured Bush-Chat.—This beautiful bird sometimes passed the school-ground when migrating, and I saw it along the King River. In 1913 a brood was reared in an orchard at Eldorado.

Ephthianura aurifrons. Orange-fronted Bush-Chat.—Seen only twice, each time near the school—8th April and 12th June, 1914.

Acrocephalus australis. Australian Reed-Warbler.—Most of these birds did not nest last season. Where one would usually find 20 nests it was hard to find one. I searched many reed-beds without any result.

Cisticola exilis. Grass-Warbler (Golden-headed Fantail-Warbler).—A flock of six was seen on 18th March, 1914.

Chthonicola sagittata. Speckled Warbler.—I saw one in the low branches of a pine-tree on the school-ground on 3rd November, 1914.

Acanthiza nana. Little Tit-Warbler.—In the early spring these little birds were common about fields and thinly-timbered country, but in the nesting season they disappeared.

Acanthiza reguloides. Buff-tailed Tit-Warbler.—A pair of these birds built a nest on the ground under a bush.

Acanthiza chrysorrhoa. Yellow-tailed Tit-Warbler.—Very common all over the country. Nests were found in every possible place—old buckets, straw stacks, pigsties, &c. In an orchard we found two nests, one above the other, forming a complete whole. In the upper nest were four eggs; in the lower, three. Two sets of birds sat on these for a few days; but an inquisitive small child, reaching in to see whether the eggs were hatched, broke two in the upper and one in the lower nest. The birds then deserted their homes.

Acanthiza lineata. Striated Tit-Warbler.—Small flocks were nomadic in the dry weather.

Acanthiza pusilla. Brown Tit-Warbler.—Numbers in the tree-tops.

Pyrholaemus brunneus. Redthroat.—One seen at Londrigan on 15th October, 1914.

Sericornis citreigularis. Yellow-throated Scrub-Wren.—Rarely seen. I found one looking for insects on a sugar gum tree.

Sericornis frontalis. White-browed Scrub-Wren.—I found one of these birds using the nest of a Spotted Diamond-Bird for itself. It was nesting in December.

Malurus cyaneus. Blue Wren-Warbler.—1st June.—A male seen in full colour. 7th July.—Our own pet Blue Wren-Warbler returned after a few weeks' absence with brilliant blue on the back, a grey cap,

and blue feathers mixed with grey on the breast. 10th July.—The same bird had his full plumage.

Artamus superciliosus. White-browed Wood-Swallow.—In November and December, 1914, these birds were nesting in one paddock on every little stump in which they could fit a nest. The hillside was dotted with these stumps, yet it was difficult to find the nests, as they were so cleverly suspended in a crevice between the stringybark and the sapwood, and the nestlings were covered with soft grey down within a few hours of hatching.

Artamus personatus. Masked Wood-Swallow.—The rarest of the Wood-Swallows in the North-East. Usually they did not return until November, and then they nested after the fashion of the White-browed species, but chose loftier sites.

Artamus sordidus. Wood-Swallow.—Usually stayed until the winter had set in. Indeed, there were few months in which some were not seen.

Colluricincla harmonica. Grey Shrike-Thrush.—Thrushes frequently used the tops of stumps. They were easily tamed, coming to be fed by the children when they called.

Grallina picata. Magpie-Lark.—Did not nest freely this season.

Corcorax melanorhamphus. White-winged Chough.—Both the birds and their mud nests were common features.

Aphelocephala leucopsis. Whiteface.—Until February, 1914, this species had not been recorded. They nested very frequently in hollows in trees, but the Sparrows apparently objected to them, and were often seen pulling the nests to pieces.

Neositta pileata. Black-capped Nuthatch.—One bird was seen in November.

Climacteris leucophæa. Brown Tree-creeper. — Very common. Young ones were observed in June.

Climacteris scandens. White-throated Tree-creeper. — Not so widely spread as the former species.

Zosterops dorsalis. White-eye.—Not very common. It seemed to be confined to certain orchards. There is a difference in opinion as to their value, but I think that the balance is in their favour.

Dicæum hirundinaceum. Australian Flower-pecker (Mistletoe-Bird).—I noticed these birds eating the pepper-tree berries.

Pardalotus striatus. Red-tipped Pardalote.—Frequently the prey of Butcher-Birds.

Pardalotus assimilis. Orange-tipped Pardalote.—Fairly common.

Pardalotus affinis. Yellow-tipped Pardalote.—Found nesting in hollows in dry trees.

Pardalotus punctatus. Spotted Pardalote.—I know of only one locality where Spotted Pardalotes nested.

Melithreptus lunulatus. White-naped Honey-eater.—Frequently met with in the gullies.

Myzomela sanguinolenta. Sanguineous Honey-cater.—One or two specimens seen about the hills near Eldorado.

Acanthorhynchus tenuirostris. Spinebill.—Around Wangaratta I often heard the clear call of this species.

Glyciphila fulvifrons. Tawny-crowned Honey-eater.—One specimen came in company with the Black-eared Miners in March, 1914.

Entomophila picta. Painted Honey-eater.—I saw two of these birds near Wangaratta on 6th March, 1914.

Meliphaga phrygia. Regent Honey-eater.—Occasionally seen near the water-courses.

Ptilotis fusca. Fuscous Honey-eater.—Several were seen at Whorouly.

Ptilotis sonora. Singing Honey-eater.—Fairly well distributed.

Ptilotis leucotis. White-eared Honey-eater.—One or two specimens seen in the eucalypts.

Ptilotis auricomis. Yellow-tufted Honey-eater.—Rare for the district. It was once seen (2nd August, 1914).

Ptilotis penicillata. White-plumed Honey-eater.—A common and pugnacious bird.

Lichmera australasiana. Crescent Honey-eater.—The salvia flowers offered honey to these birds, which paid regular morning visits to them.

Myzantha garrula. Noisy Miner.—This bird was frequently a puzzle on account of its many and varied notes. It is much in evidence at lunch time.

Myzantha melanotis. Black-eared Miner.—A small flock visited the Londrigan district in March, 1914.

Acanthogenys ruficularis. Spiny-cheeked Honey-eater.—Until a bird and a nest containing two eggs were discovered in January, 1915, this bird had not been reported.

Tropidorhynchus corniculatus. Friar-Bird.—This bird was not as common as *Philemon citreogularis*, the Yellow-throated Friar-Bird, which was often seen in the orchards.

Anthus australis. Australian Pipit.—Apparently they stayed in the fields all the year round. I have records for every month last year.

Alauda arvensis. Skylark.—A Skylark came into the school-ground last year, and another was reported from a few miles away. I did not hear them sing in the district.

Mirafra horsfieldi. Bush-Lark.—Seen in company with the Australian Pipits.

Carduelis carduelis. Goldfinch.—Large flocks occasionally visited the school-ground.

Passer montanus. Tree-Sparrow.—Fairly common in and around Wangaratta.

Passer domesticus. House-Sparrow.—These introduced birds did good by eating cockchafer beetles, but Welcome Swallows and others suffer from their actions. A pair of Swallows built in a disused tank, and when their eggs were laid Sparrows flew in, threw out the eggs, and then broke down the nest. They behaved in much the same fashion with the nests of other birds.

Stagonopleura guttata. Spotted-sided Finch.—Seen occasionally.

Zonæginthus bellus. Fire-tailed Finch.—Exceedingly rare; I found one bird:

Tæniopygia castanotis. Chestnut-eared Finch.—One pair was seen on a haystack.

Ægitha temporalis. Red-browed Finch.—Small flocks commonly met with. They sometimes made a nest among the reeds.

Sturnus vulgaris. Starling.—These birds infested the hedges to such an extent that people frequently cut the plants down.

Oriolus viridus. Olive-backed Oriole.—These birds destroyed a great many "woolly-bear" caterpillars in one paddock by knocking them against a tree and then eating them. An occasional nest was found.

Corvus coronoides. Hazel-eyed Crow.—Not often seen.

Corvus australis. Australian Raven.—Wherever one went these birds were met with. One used to enter our fowl-house and steal the eggs.

Strepera graculina. Pied Bell-Magpie.—Small flocks suddenly paid a visit to some particular spot, and filled the air with sharp cries, something like the bark of a dog. They came in dozens to the pepper-trees in the school-ground.

Strepera anaphonensis. Grey Bell-Magpie.—Very common in the orchards.

Strepera fuliginosa. Sooty Bell-Magpie.—I saw, at Carrara-garmungee, two dark birds which I took to belong to this species. They were fearless, allowing me to get close to them, first hopping about on the branches of a dead tree, and then coming down to the ground. This was on 20th April, 1914.

Cracticus nigrogularis. Black-throated Butcher-Bird.—Seldom seen.

Cracticus destructor. Collared Butcher-Bird.—As destructive as it is common, being responsible for the death of many Pardalotes.

Gymnorhina tibicen. Black-backed Magpie.—This species was well represented, as also was *Gymnorhina leuconota* (White-backed Magpie). The birds were both tame and playful. After a good dinner from the scraps left by the children, they would get twigs and roll on their backs, tossing the scraps about like mischievous puppies. One bird would imitate the "miaou" of our cat, knowing that I would be likely to go out with some meat if I thought that the cat was hungry.

Further Field Notes on the Emu-Wren (*Stipiturus malachurus*).

BY (MISS) J. A. FLETCHER, SPRINGFIELD (TAS.)

DURING the two seasons which have elapsed since my notes on the Emu-Wren (*Stipiturus malachurus*) appeared in *The Emu*,* I have had many opportunities of studying these fascinating birds. Each pair of birds keeps to its particular haunt throughout the year. After travelling some distance in search of food, the birds will invariably be found back at the home corner in the evening or morning.

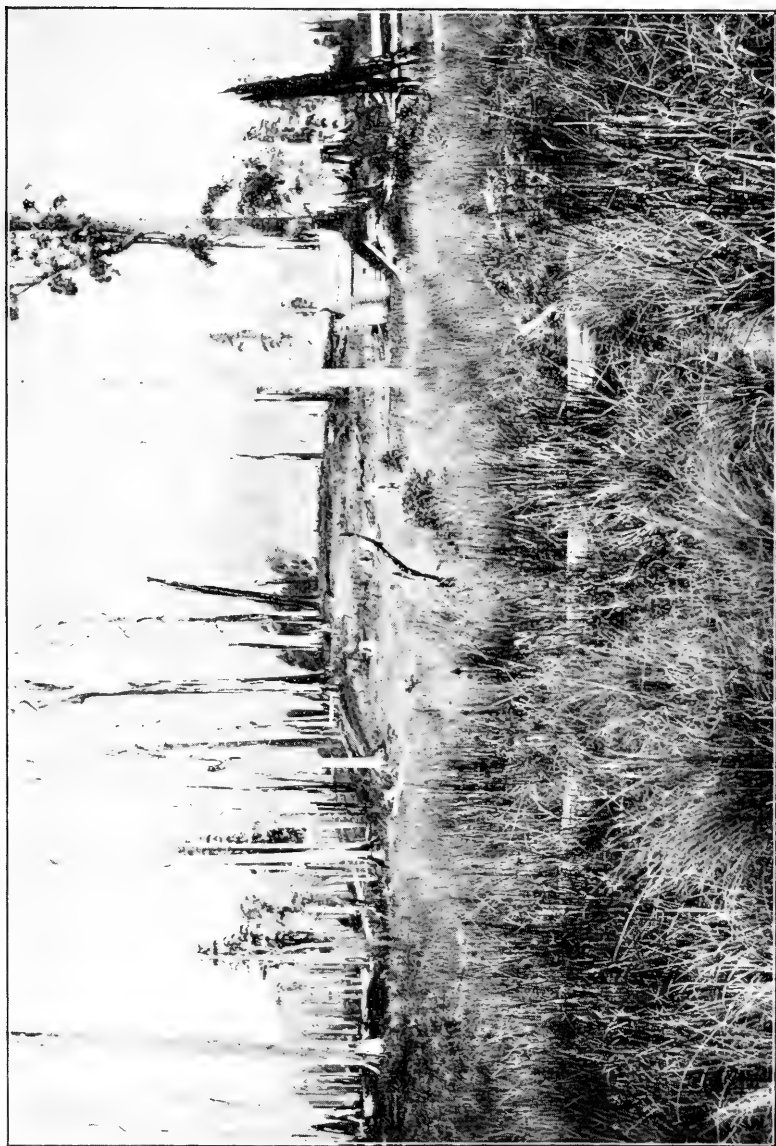
* *Emu*, vol. xii., part 3.

In autumn and winter Emu-Wrens in the Springfield district occasionally leave the shelter of the rushy swamp and wander among the blackberries, the adjacent paddocks, and, once in a way, venture into gardens. The young of the last brood remain with their parents until May or June, when they are driven off to seek companions and a haunt of their own. They are not permitted to remain in the area which their parents inhabit. Though generally considered to be weak flyers, I find that, should occasion arise, these birds are capable of sustained flight. Particularly is this the case with the female. The angle at which the tail is held previous to alighting rather gives the impression that its owner is exhausted, but this is not so. The stems of the big reeds (*Juncus pallidus*) are one of their chief sources of food supply. These reeds the birds split open, and devour the many forms of insect life which shelter therein.

The male Emu-Wren—or “Bluebeard,” as he is called locally—retains his blue throat throughout the year, and is never seen ragged and unkempt as are the males of the Wren-Warblers (*Malurus*). The manners and habits of the birds under notice appear intermediate between those of the *Acanthizæ* and the *Maluri*. In the strain of their feeble song, which is, however, uttered by both sexes, and also in the mode of nest-building, they resemble the Wren-Warblers. Again, their alarm notes, their calls to one another, their method of capturing some of their food, the female’s manner of dropping from the nest when disturbed, and the attaining by the young of the full plumage from the nest, all indicate kinship with the Tit-Warblers. Having had ample chance of studying them during the nesting season, I can speak with confidence on their habits at that time.

The nest is placed in a variety of situations—from the dense reed-beds of our boggy swamps to the dry, open spaces of recently burnt off reeds a few inches in height; from near the top of a high clump of blackberries to the base of a rushy sag almost on the ground. When seeking for the nests, I generally examine small isolated clumps first, as these are more often preferred. The opening of the nest may face north, south, east, or west. Probably an easy drop for the bird is the first consideration. The female does all the work of nest-construction, and, being a wise little creature, stops work at 11 a.m. and does not resume until nearly 4 p.m. The interval is spent in “Bluebeard’s” company, feeding and resting. The male takes the lead, and until the female assumes control of their movements the watcher need not hope to find the nest. When leisure time is over she returns to work in real earnest, either flitting from clump to clump or taking long flights back. She waits in the rushes for “Bluebeard,” and, as soon as he comes nearer, away she goes again. When nearing the nesting site, if building, she gathers material before the last flight, then, overflying the nest, creeps back to the chosen spot.

The eggs are generally laid by 11 a.m. When sitting the female returns to her duties at the same hour, having quitted the nest



Haunt of Emu-Wrens, Springfield, Tasmania.

FROM A PHOTO. BY CHAS. BARRETT.



between 9 a.m. and 10 a.m. She also takes a short feeding flight again in the evening. Therefore, the above hours are the best if an observer wishes to find the nest through watching the bird's movements. As a rule, when returning to her nest or carrying food to the young, the bird flies in long, hurried flights, chiefly in a straight line, and one has some exciting moments trying to keep her in view. To give an idea of how these mouse-like birds cover ground, I might state that I have followed them three-quarters of a mile up one of the swampy creeks and back again.

Green moss is the first material chosen for the nest, and this is placed low down in the tussock. Sometimes the framework of the nest consists almost entirely of this moss. The lining may be of feathers, fern hair, fur, or thistledown. Very often a good idea of what birds are frequenting the swamp may be gained through an examination of the feathery lining. Except in one instance, my observations show that an egg is laid each day till the clutch is complete, and the female begins to brood on the day on which the last egg is laid. She does all the brooding, which extends over 10 or 12 days. During his mate's retirement the male keeps watch. If danger threatens he flies past or near the home clump, calling to the female. She drops from the nest, creeps along the ground, then appears on a rush uttering the alarm note of the Brown-rumped Tit-Warbler (*Acanthiza diemenensis*), then joins her mate. If watched, she invariably flies in a complete circle to return to the nest.



Young Bronze-Cuckoo in Emu-Wren's Nest.

FROM A PHOTO, BY MISS J. A. FLETCHER.

When first hatched the young are naked except for a few tufts of blackish down on head, shoulders, and tail. They become fledged rapidly, the blue feathers of the males appearing on the fifth day. If the young are constantly inspected the parents become very apprehensive, and soon remove the brood from the nest. In one case the chicks were among the rushes as early as the eighth day. Both parents feed the chicks. The favourite position for feeding is over from the back of the nest. I have watched birds bring the following "items" to their young:—Moths, butterflies, grubs, caterpillars, beetles, spiders, ichneumon flies, and other objects that were unrecognizable. When the young are strong enough to fly, the family to a certain extent separates. "Bluebeard" takes care of one chick—a male—and the female has the remaining one or two, as the case may be. Of course, they keep together, or practically so, but each parent attends to the needs of its own charge. Toward evening all return to roost near the nesting-site. I have often watched the parent birds getting the "children" back to the nursery, and have occasionally stood in the way purposely to observe the dodges used to get the brood safely past me. The first brood appears about the second week in September, and by the middle of November these are cast off and a second nest is built. Still, there are exceptions. In two cases last season the young followed their parents though the female was brooding on the second clutch of eggs.

Last season I observed 25 first clutches. In 24 cases the young were cared for until they were able to look after themselves. One pair of birds lost its brood when the chicks were a week old; the nest was robbed. Another pair, whose first nest, containing three eggs, was burnt, subsequently reared a young Bronze-Cuckoo (*Chalcococcyx plagosus*). The nest was found when the Cuckoo was a few days old. Its feathers were growing, and, though I replaced the two ejected eggs of the Emu-Wren several times, the Cuckoo took no notice of them. When I visited the nest a week later the Cuckoo was well feathered. It appeared to fit tightly in the frail nest. It was a savage little creature, and pecked angrily if I put my hand near it, and then sank down with a self-satisfied air. I tried for four hours to get a photograph of the foster-parents feeding the Cuckoo, but without success. They came to within about two feet of the nest, even perched a few inches from me, but would not come within range of the lens. Rain began to fall, and I was forced to leave, after exposing a plate on the Cuckoo. The bird had gone when next I passed that way.

In spite of the drought conditions, last season must have been favourable for the Emu-Wrens. Besides the broods noted, I saw 26 clutches of eggs. In one case there were four eggs, four clutches were each of two eggs, and in the other cases there were three eggs, one nest containing two eggs of the Emu-Wren and an egg of the Fan-tailed Cuckoo (*Cacomantis flabelliformis*).

From the figures quoted above it could be imagined that the Stipituri were the commonest of our birds, but so dense are the swamps which they frequent that only a bird observer would notice the birds.

Note re Food in Rushes.—Examined at my request by Mr. Frank Littler, F.E.S.:—Spiders; ants; coleopterous larvæ, probably aquatic; remains of coleoptera (fragments too small to identify with certainty); evidences of lepidopterous larvæ, belonging to either or both the families *Æcophoridæ* or *Elachistidæ*.

Stray Feathers.

Maternal Instinct Strong.—Some years ago I mentioned in *The Emu* the fact of a Black-and-White Fantail (*Rhipidura motacilloides*) being found dead on her nest, which contained young ones, after a flood had subsided, in the Western District, Victoria. The parent bird would not desert her young as the flood rose, and she therefore died with them; her claws were fastened into the web of the nest, which kept her from being washed away. A similar instance was noted not long ago by Elwyn Allender, of Mount Cole Creek, near Ararat, Victoria. It is interesting to note the strong maternal instinct in these birds; possibly some members know of similar cases. I am reminded of a hen, which was found sitting on the ground, dead, after a bush-fire had passed over the country. She was partially burnt, and when she was picked up her little chicks were found under her, uninjured. She had given her life to save her brood, as she could easily have escaped herself.—D. LE SOUËF. Melbourne, 5/1/15.

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Nankeen Night-Herons.—I have perused Mr. H. L. White's "Notes on the Nankeen Night-Heron (*Nycticorax caledonicus*)."^{*} This bird has been a visitor for years past to the Maitland district, coming from Cabbage-tree Island, Port Stephens. I have frequently seen Nankeen Night-Herons on branches of trees, particularly willows, growing on the river banks, near the town of West Maitland. They have never, however, assembled in such numbers as Mr. White observed. In a boat I have approached them very closely. I think that all the swamps between the Hunter River and Port Stephens have been drained, and the swamps between Maitland and Newcastle would be nearer to the Heronry than the Myall River swamps. We have this year been visited by many wading birds that have not been seen around here for very many years. Amongst them were the Greater and Lesser Bitterns and the Pacific Heron.—W. J. ENWRIGHT. West Maitland, N.S.W., 13/3/15.

^{*} *Emu*, vol. xiv., part 3, pp. 174, 175.

Swifts and Weather.—In a paper read before the Royal Society of Tasmania a few years ago, I endeavoured to trace a connection between the appearances of the Spine-tailed Swift (*Chætura caudacuta*), both in this State and in Victoria, and disturbed weather conditions, showing that, in all cases which had come under my observation, the appearance of this Swift meant atmospheric change. This was again strikingly demonstrated on 27th February, 1915, when, in the morning, I saw 50 or 60 of these fine birds coursing insects over the paddocks near the Don road. The day was sultry but fine. Soon afterwards, I met a friend who spends most of his life out of doors, and, like myself, takes pleasure in noticing natural objects. I told him that I had seen a large party of Swifts for the first time this summer, when he remarked—"Then rain is not far off." That very evening a light rain began to fall, and practically the whole of the following day was wet. Not only so, but for several days afterwards we had high winds and showers, culminating on 7th and 8th of this month (March) in a tremendous north-westerly gale, which did a good deal of damage. All this disturbance came after months of fine, settled weather. Yesterday, 9th inst., the Swifts were migrating, passing in twos and threes every few minutes, from S.E. to N.W., during the afternoon from 2 until 4 o'clock. I consider this early departure means cold and rough autumn weather. The Tiers, which are in view from my ground, are already white with snow.—H. STUART DOVE. West Devonport, Tas., 10/3/15.

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Notes from Springfield (Tas.)—The Long-tailed Wren-Warblers (*Malurus longicaudus*) are now in heavy moult, and have been so for the past fortnight. The males have only the remnant of blue on the back of their heads, and brown feathers are showing throughout the black velvety patches of their spring dress. A family of these birds has spent the last eighteen months in the back garden here. They nested in the blackberries on the other side of the fence, and brought their brood along as soon as the young birds could fly. They all hop about the back verandah, pick up bread crumbs thrown to them, and also search the fuchsias on the window stand. If crumbs are placed on the window-sill the female will take them, even if anyone is sitting near by. These little birds enjoy a few morsels of fat. As both broods reared this season have been brought to the verandah, there is often a flutter of brown wings when anybody runs up the steps quickly.

A Yellow-throated Honey-eater (*Ptilotis flavigula*) lived in the school-ground last winter. He would eat the jam from crusts thrown down by the school children, and enjoyed a lolly very much, provided that it had been sucked or wetted with water before being thrown to him. This bird has now returned. Evidently nesting responsibilities have ceased. The Lesser White-backed

Magpies (*Gymnorhina organicum*) reared their young as usual in the big gum-tree in the school-ground. One pair brought three fledgelings to the play-ground, where their constant calling for food was not always the sweetest music during school hours. The members of this family, with one exception, have now sought a wider range. One young bird keeps about, and comes close when hungry. It stands a few feet away from one, and eats bits of meat, holding them with its claws. The other day, during dinner recess, I saw the bird standing in front of three little boys, who were giving it scraps from their sandwiches.—(Miss) J. A. FLETCHER. Springfield (Tasmania), 6/2/15.

* * *

A Nesting Record of the Red-capped Robin.—A pair of Red-capped Robins, *Petroica goodenovii* (*Whiteornis g. goodenovii*), have nested and hatched four clutches of eggs. These are the second pair of Red-capped Robins that I have noticed on the plains near Glenelg in 30 years. These pairs seemed to have adapted themselves to the altered environment. The young left the first nest on 19th August; it was built facing north, on a low branch about 2 or 3 feet from the ground. Very few leaves were on the tree at that time of year. On 4th September three eggs were in a second nest built in a fork about 8 feet high. On 6th September the young were just out of the eggs. On 29th September they left the nest. It was very amusing to see the old birds playing tricks to draw me away from the young ones. On 20th October the female bird was sitting on her third clutch. On 26th October the young Robins were out of the eggs. While I was watching the young, the female bird came to feed them with a spider, flying within a foot of my face; the day was very hot. On 8th November the young Robins were sitting on the edge of the nest. On 27th November the female bird was sitting on her fourth clutch of two eggs. This is the third time she has used the same nest. 5th December saw the young Robins out of the eggs; they left the nest about the 16th. The weather was very hot while the young were in the nest. When watering fruit-trees I made a trench round the trees to run the water in; this made insects and spiders run. The Robins took advantage of this, and, perching on the lower branches, they darted down on the insects. Though it was very hot at this time, I never saw them drink or touch the water. I never noticed the male bird sit on the eggs or young, but he was as active as the female bird in feeding the young ones. I would like to hear from bird-lovers or ornithologists if it is unusual for native birds to have four broods in the same season and to rear all the young ones. The old birds seemed to drive the nestlings away from the breeding-ground. I put barbed wire around the trunk of the almond tree to keep the cats away. Did the birds notice if the wire was to protect them? — SAML. SANDERS. Sturt, South Australia, 19/8/14.

Photographing Shy Birds.—During three or four years' experience of bird photography one learns many things; but the fact which has caused us most surprise has been the difficulty experienced in photographing some of the birds that we had anticipated would be easy subjects. We found that the confiding Yellow-tailed Tit-Warbler (*Acanthiza chrysorrhoa*) and the White-fronted Bush-Chat (*Ephthianura albifrons*), when faced by a camera 18 inches from their "front door," showed a degree of obstinacy more than worthy of many of the most retiring birds. When dealing with the Little Grass-Bird (*Megalurus gramineus*) and the Speckled Warbler (*Chthonicola sagittata*), however, we expected trouble—and got it. It was in December, 1912, that we first located the nest of a Grass-Bird. We waited till the young had left the nest, and then had to spend half a day hidden among the rushes to catch them. After five or six hours' waiting, a few exposures of the parent birds were made, but by that time the light was bad, and no presentable negatives were obtained. In the following year we were more fortunate when a nest was discovered. The parent birds persisted in approaching the young ones by way of all the depressions and under all the reeds available. An elaborate barrier made of white handkerchiefs and the like induced them to come into the open. The young, when they left the nest, so closely resembled the rushes in colour, and were so quick in their movements, that we were obliged to take them home with us overnight; we could not have caught them again. From October, 1913, onwards we have, on several occasions, set the cameras before a nest of the Speckled Warbler, but it was not till October, 1914, that we were able even to make an exposure on the parent birds. In that month we tried about five different pairs, and were fortunate enough to find one somewhat less timid than the rest. A few photographs were obtained. On account of the distance at which the cameras had to be operated (about 40 feet of cotton being used to release the shutter), a piece of stone was placed in front of the nest in the hope that a bird would hop on to it and thus indicate when it was in a correct position for an exposure. We soon found that the birds were using the nest and our piece of stone to screen themselves from the camera. It was only when the entrance to the nest had been blocked up and the stone removed that a clear view was obtained. The removal of the stone meant that it was largely a matter of chance whether or not the photograph would be "sharp." Of about 25 birds that we have photographed, two only avoided prominent points when approaching the camera. This made them specially difficult to deal with. In most cases we are able to set our cameras in anticipation of the bird perching on the highest object within a reasonable distance of the nest or young. Although this point may be avoided at first, owing to its being directly in front of the lens, it is almost certain that it will be used as soon as the bird has gained sufficient confidence to approach so near.—S. A. LAWRENCE and R. T. LITTLEJOHNS. Melbourne, 26/2/15.



Little Grass-Bird.

FROM A PHOTO. BY S. A. LAWRENCE



Speckled Warbler.

FROM A PHOTO. BY R. T. LITTLEJOHNS.



From Magazines, &c.

Historic Advertisement.—Professor Ernest Scott, of the University of Melbourne, when working at the early files of the *Sydney Gazette* at the Melbourne Public Library, came across the following historic advertisement in the issue of 21st September, 1806, and was kind enough to send a copy to the editors of *The Emu* :—

“ PROPOSALS

“ For Publishing by Subscription

“ The Birds of New South Wales, with their Natural History.

“ This work is the first fruits of the labour of Mr. John Lewin, A.L.S., who has spent near eight years in this colony, occupied in collecting and arranging materials for its publication.

“ The first volume will contain eighteen plates, and will be published in the most elegant manner. Many of the birds are new subjects, and will be systematically arranged and cyentifically named, with their descriptions in French and English.

“ The price of this volume, in imperial quarto, two guineas.

“ Gentlemen willing to become subscribers to this work will favour the author, Mr. John Lewin, with their names, which will be thankfully received by him.

“ N.B.—This work will be sent to England by His Majesty's ship *Buffalo*, under the care of a gentleman, for immediate publication. The terms of subscription are—half the subscription money to be paid at the time of subscribing, and the other half on the delivery of the work.”

* * *

Australian Crane (*Antigone australasiana*) in Captivity.—An interesting article, entitled “Cranes in Captivity,” is published in the *Avicultural Journal*, December, 1914. The author writes of the Australian Crane as follows :—

“ Another species of Crane, well worthy of the serious attention of those interested in these birds, is the Australian Crane, the ‘Native Companion’ of the colonists. This bird is of a different shade of colour to the preceding species, being rather a bluish, or French grey, as the tint of its plumage, the top of the head and the beak are of an olive-green colour, as is also the gular pouch ; the back of the head is papillose skin of a brilliant scarlet. This Crane is not so reliable in its temper as the gentle Demoiselle, and most individuals are inveterate practical jokers, as evidenced by the sly manner with which they will sidle up alongside anyone who may be inside their enclosure, looking the pictures of innocence, and then give a nasty lunge with their spear-like beak at the person of the intruder, usually selecting, if it be a man, the back of the calf of the leg ; or, if a lady, the back or palm of the hand. Like the majority of the Cranes, this species is very hardy, and may safely be left out of doors during all weathers,

saving the most exceptionally severe, when it is advisable to put them under shelter. They are so disregarding of the state of the climate that they will wade in a half-frozen pond during a frost and wait until they are literally frozen in and have to be released. In spite of my fears that they would suffer from the prolonged exposure to the ice-cold water, the experience seemed to have no ill-effects upon them, and they were none the worse for it. Although I have not as yet had the good fortune in my own aviaries, these particular Cranes have nested in this country, but I am not certain whether the eggs hatched and the young reared to maturity; I think that both the Duchess of Bedford and Mr. H. D. Astley were equally unfortunate in this respect. If the male bird is pinioned there is no need to perform the same operation on the hen, for she does not appear to want to fly away, although fond of long aerial flights, from which she will always return—at least, such is my experience.

“The Australian Crane is a very jealous bird, quick to take offence, and deeply resents the intrusion of another Crane of a different kind to himself on that portion of the enclosure round which he has set an imaginary boundary, but will, directly a trespasser is noticed, run at him with outstretched wings and clattering beak and fairly chase him off the private territory that has been appropriated by himself and his mate; in fact, the solitary example of the Common Crane is constantly being chased about by both the pair of Australian Cranes and the two Cape Crowned Cranes as he inadvertently steps into the area reserved to themselves by his companions, the three species being kept in one paddock.”

* * *

Bird Protection in America.—The annual report of the National Association of Audubon Societies for 1914, published in *Bird-Lore* for November–December, 1914, makes interesting reading. In his report Mr. T. Gilbert Pearson, the secretary, states:—

“The influence of the Audubon movement throughout the United States to-day is astounding, especially when one considers the comparatively limited expenditure of funds in the course of a year. It is a work of the people, including bird-lovers and wild-animal conservationists of every type, and new fields of opportunity are continually opening before us. The past year has been marked by a steady maintenance of our more important fields of effort, by distinct gains in many directions, and with loss nowhere along the line. The chief nursery of the sea-birds of the Atlantic Coast of the United States is among the islands off the coast of Maine. During the past summer, thirty-five of these islands have been occupied by breeding colonies, not including several small ledges, where scattering pairs overflowing from near-by colonies gather to nest. The Association has continued to exercise a guardianship, as usual, over these birds, to protect them as far as possible from eggers, and from possible

raids of Indians, who annually sell Gulls' wings in the towns of Nova Scotia. In addition to those watching the Maine colonies, the Association's line of wardens extends southward along the coast, stationed at various places in Massachusetts, New York, and New Jersey. Three others are stationed in Florida, and two in Louisiana. These latter are employed jointly with the Government to guard some of the Federal bird-reservations of that southern territory. Colonies of birds at various points inland, notably on Moosehead Lake, Maine, and in Lake Michigan, are protected in like manner. . . . In the fourteen colonies of Herring Gulls protected during the past summer, it is estimated that there were 59,420 adult birds inhabiting the islands; in the eleven colonies of Common and Arctic Terns, 50,240; and in five colonies of Black Guillemots, 1,540. Among the other more numerous species we may mention Least Terns, 9,550; Forster's Terns, 5,225; Royal Terns, 17,500; Cabot's Terns, 3,800; Clapper Rails, 5,000; Puffins, 600; Eider Ducks, 100; Leach's Petrels, 5,000; Laughing Gulls, 118,400; Mergansers, 200; Pelicans, 4,500; Ospreys, 200; Louisiana Herons, 25,700; Black-crowned Night-Herons, 3,000; and Black Skimmers, 15,500, in addition to large numbers of Willets, Caspian Terns, Spotted Sandpipers, and Wilson's Plovers. The enumeration above does not include, of course, many thousands of land-birds, which, in these isolated spots, are apparently in no special danger of human disturbance; nor does it include the tens of thousands of Wild Ducks that in certain seasons of the year are found on some of the guarded reservations.

"Quite aside from this general warden work is our special effort for the protection of Egrets, on behalf of which sixteen guards were employed during the past spring and summer. These colonies are situated in South Carolina, Georgia, and Florida. Egrets to-day are not sufficiently abundant to cause much embarrassment in determining the numbers that inhabit any particular colony; especially has this been the case with those rookeries in Florida which have been personally visited by Oscar E. Baynard, our Supervising Warden for that State. During the past summer, Mr. Baynard spent many days struggling through these rookeries to count the occupied nests, and in doing so he was often forced to wade waist-deep in water infested with moccasins, alligators, and innumerable unpleasant insects, as the secretary can testify, after having accompanied him on one of these expeditions. In the eleven colonies of large Egrets protected, and carefully counted, we believe there were about 5,100 birds; while the count of Snowy Egrets, in thirteen colonies, was 2,375. With few exceptions, Egrets were found in rookeries inhabited by numerous other wading birds. Counts and estimates of these show Black-crowned Night-Herons, 1,055; Louisiana Herons, 6,200 (in addition to those being cared for by the general warden force, above referred to); Ward's Herons, 1,000; Green Herons, 800; Least Bitterns, 700; Water Turkeys, 2,922; Purple

Gallinules, 1,500; Florida Gallinules, 2,000; Little Blue Herons, 7,076; White Ibis, 26,800; and Wood Ibis, 60,500. It is with special pleasure that we record the presence, in our protected colonies, of 160 Limpkins and 147 Roseate Spoonbills, scattered through five rookeries; also three pairs of the now extremely rare Glossy Ibis. Other interesting birds that have had protection in these guarded nesting-groups are Wood Ducks, Great Blue Herons, Swallow-tailed Kites, King Rails, Boat-tailed Grackles, Florida Redwings, Yellow-crowned Night-Herons, and Florida Dusky Ducks. Many of the estimates given above, particularly those in reference to the Wood Ibis, the Little Blue and the Louisiana Herons, are far beneath the true figures. I believe it very conservative to state that about 550,000 water-birds of various kinds received admirable protection from their human enemies during the nesting season of 1914, as a result of the watchful efforts of this Association."

Review.

["Mutton-Birds and other Birds." By H. Guthrie-Smith. Whitcombe and Tombs Ltd. Price 10s.]

NEW Zealand ornithologists should gain pleasure and profit from the pages of Mr. Guthrie-Smith's new book. Both text and illustrations are excellent and the volume is well printed and bound. There are 21 chapters, none of which is in the least degree uninteresting, though, of course, some are more attractive than others.

The opening chapter deals with sanctuaries, and tempts to quotation. "Diminution in the numbers of many species is inevitable in the settlement of a new country. It is the price paid for the displacement of the thistle and thorn in favour of the vine and the fig-tree; but, although thus thinned in regard to numbers, it does not follow that the species itself need become extinct, and if we save the species we save all. Sternly, therefore, repressing all sentiment, and recognizing that the chief end of man, or at any rate man in such close proximity to the millions of the yellow races, is to populate his native land, let us examine the chances of our surviving birds. If it can be proved that we can in no way lose by their preservation, if it can be shown that not one acre fit for settlement need be withheld, then, indeed, carelessness becomes worse than carelessness. It becomes a disgraceful apathy, and a reproach to every intelligent man in New Zealand. It can be proved."

The Kaka, Kiwi, Fern-Bird, Weka, and other remarkable New Zealand birds have been closely studied by the author. The chapter on the Kaka is especially interesting. "During February of 1911," writes Mr. Guthrie-Smith, "the Kaka were in thousands on the lower slopes of the great wooded spurs that run from Table Hill into the Rakiahua Valley. The forest was alive with their movement and echoed with their clamorous cries. A constant

shower of rotten wood and bark rained from above, and 'Banjo' ran from tree to tree looking up at the unattainable birds and barking with excitement. About one trunk he circled, barking and sniffing, and then again returned to it, still not absolutely satisfied; and I suppose it was this second visit and the tone of his bark that caused me instantly to mark the tree. It was a kamahi of considerable girth, but its shell only, alive and green; the interior was rotted away until almost level with the ground, and the space within—about 2 feet in diameter—floored with wood powder, dry and sweet. On this brown carpet rested two eggs, small for the size of the Parrot, dull white in colour, and evidently much incubated. The interior of the hole had been gouged and chiselled by the sitting hen until no scrap of it within neck-stretch remained unmarked." The author succeeded in obtaining photographs of the Kaka at the nesting-tree.

Correspondence.

WORK OF THE UNION : SOME SUGGESTIONS.

To the Editors of "The Emu."

SIRS,—In the last issue of *The Emu* (vol. xiv., part 3) two of our most prominent ornithologists make certain disassociated remarks that seem to me to be well worth taking into serious consideration conjunctively, and to merit amplification.

Firstly, Mr. A. J. Campbell, in his article on "Missing Birds," states:—"Would it not be well for members to unite to protect, or to aid in the protection of, some of the fast-failing forms of our avifauna? In point of fact, is not protection of native birds one of the chief planks of the R.A.O.U.?" And Mr. Henry L. White, when writing on "Australian Cuckoos," says:—"I consider that the future preservation of our native birds is largely in the hands of the public school teachers."

In offering a few remarks on matters arising from these notes, I want first to endorse Mr. White's opinion. Certainly, the ornithologist of the future is under the care of the school teacher at present, and on the training he receives there depends markedly his subsequent attitude toward the study. And it is equally certain that, if boys have instilled in them a proper appreciation of birds (and, accordingly, a protective spirit), a vast amount of good will have been accomplished. Very well. What, then, is the R.A.O.U. doing toward this desirable end? Not all that it should, I am afraid. That many members have assisted the Education Departments of their respective States in a general way is true enough; but systematic service is needed.

To begin with, the official guides on the highway of knowledge—the teachers—should, I think, be given more attention. Speaking only of Victorian schools, I know that there are many teachers who take a warm, vital interest in our birds, and find them a source of inspiration; but I know, too, alas! that many

public school instructors do but "teach birds" because they must, and then in the most cursory way. It naturally follows that this spirit of indifference communicates itself to the plastic minds of the scholars, and consistent indifference is oftentimes more harmful to a movement than is open antagonism. Such teaching ought not to be, and the Union should, I think, make a special point of obtaining the interest of Australia's school teachers. Induce them to become members of the Union; show them that, by not being on intimate terms with the birds, they have thus far missed one of the chief joys of life; show to those who have not already realized it the value of utilizing the outdoor life-interests of the child, and ask them to lead the child gently to *feel* what one of our American friends termed "the song of existence pulsing through the process of the seasons." Keep out the scientific part of the business. The smaller child is concerned only with whatsoever things are lovely; interest in technicalities will unobtrusively grow as this circular path of knowledge broadens.

With regard to nomenclature, I may cite a personal experience with a class of budding teachers (ages 14 to 18) with whom I had the pleasure of discussing birds once weekly for eight or nine months of last year.* Aided in the field by Dr. J. A. Leach's valuable "Bird Book," these young people got on with their subject so well that they were led to inquire into the generic and specific titles. Then the trouble began. It was not the glimpse of the trinomial system they received that caused it so much as the alterations of many recognized scientific names to others whose derivations tell nothing (proper names for genera are an especial abomination), and the irritating splitting of genus upon genus. What folly all this chopping and changing is! Why cannot the British Union's sane policy (quoted recently by Mr. A. H. E. Mattingley) of allowing long-recognized names to stand be followed?

In conclusion, let me touch on the initial part of Mr. Campbell's quoted note concerning "Missing Birds." I would like to say that, if members are to unite to the end of protecting fast-failing aviforms, they will have early to consider the menace within their own ranks. For who can gainsay the fact that close collecting is completing the work of natural agencies in thinning out such birds? Certainly, as Mr. Campbell hints, it is necessary that something decisive should be done, and, by way of a gentle beginning, I would suggest that only a *national*, judicious collector should take a gun on the annual excursions of the Union to out-of-the-way localities. Then overlapping would be avoided, and there would not be the danger—and bad example to "laymen"—of every rare bird that is seen being sacrificed. To awaken in a child (young or old) interest and delight at, say, the value and winsome ways of "the psalmist of the dawn" (*Eopsaltria australis*) is worth much to Australia.

Maryborough (Vic.), 29/1/15.

ALEX. CHISHOLM.

* In an honorary capacity.—Eds.

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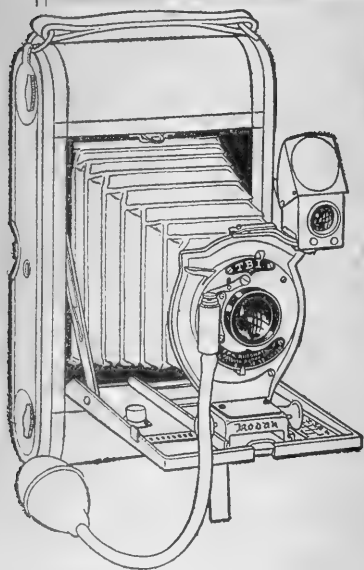
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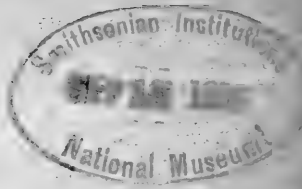
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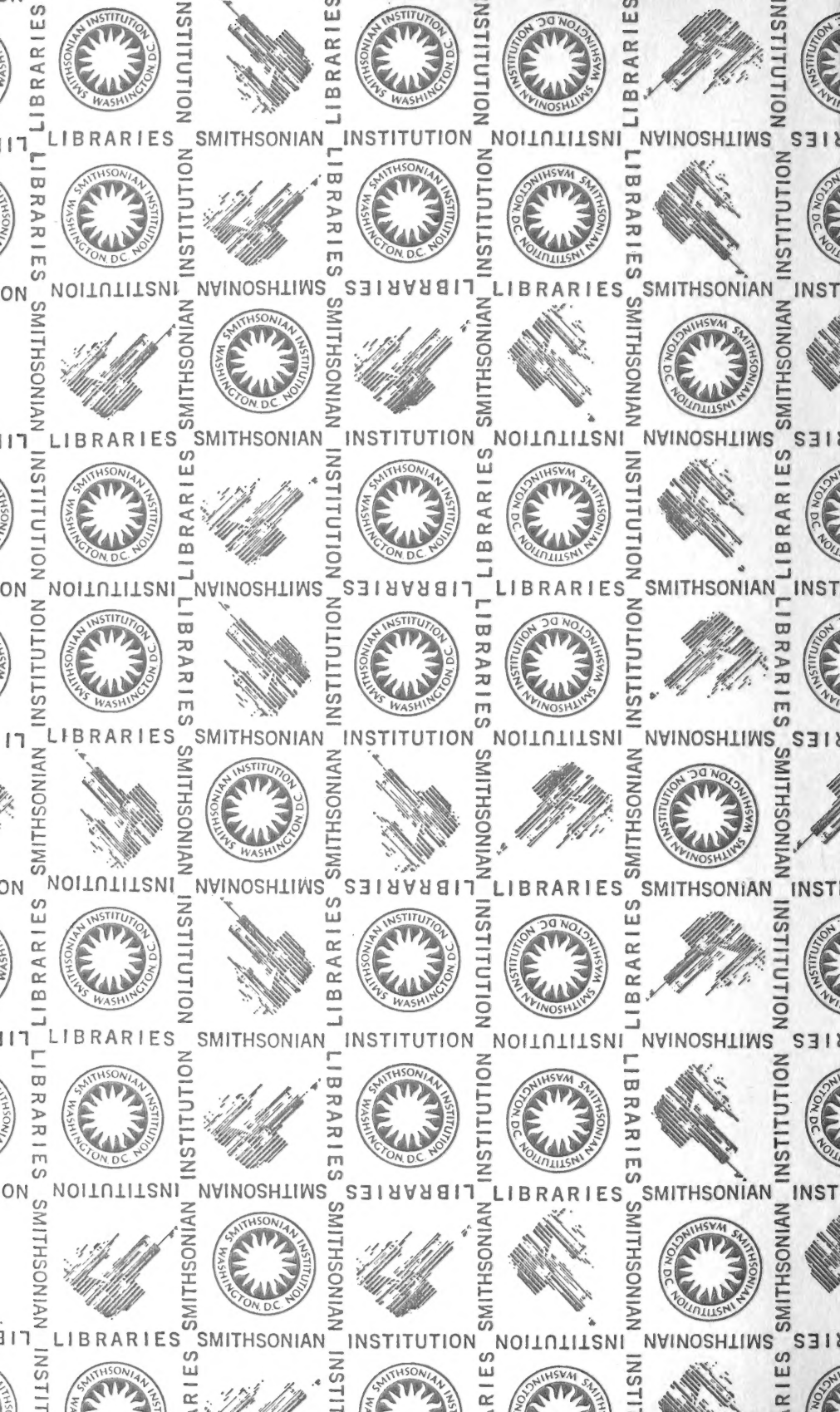
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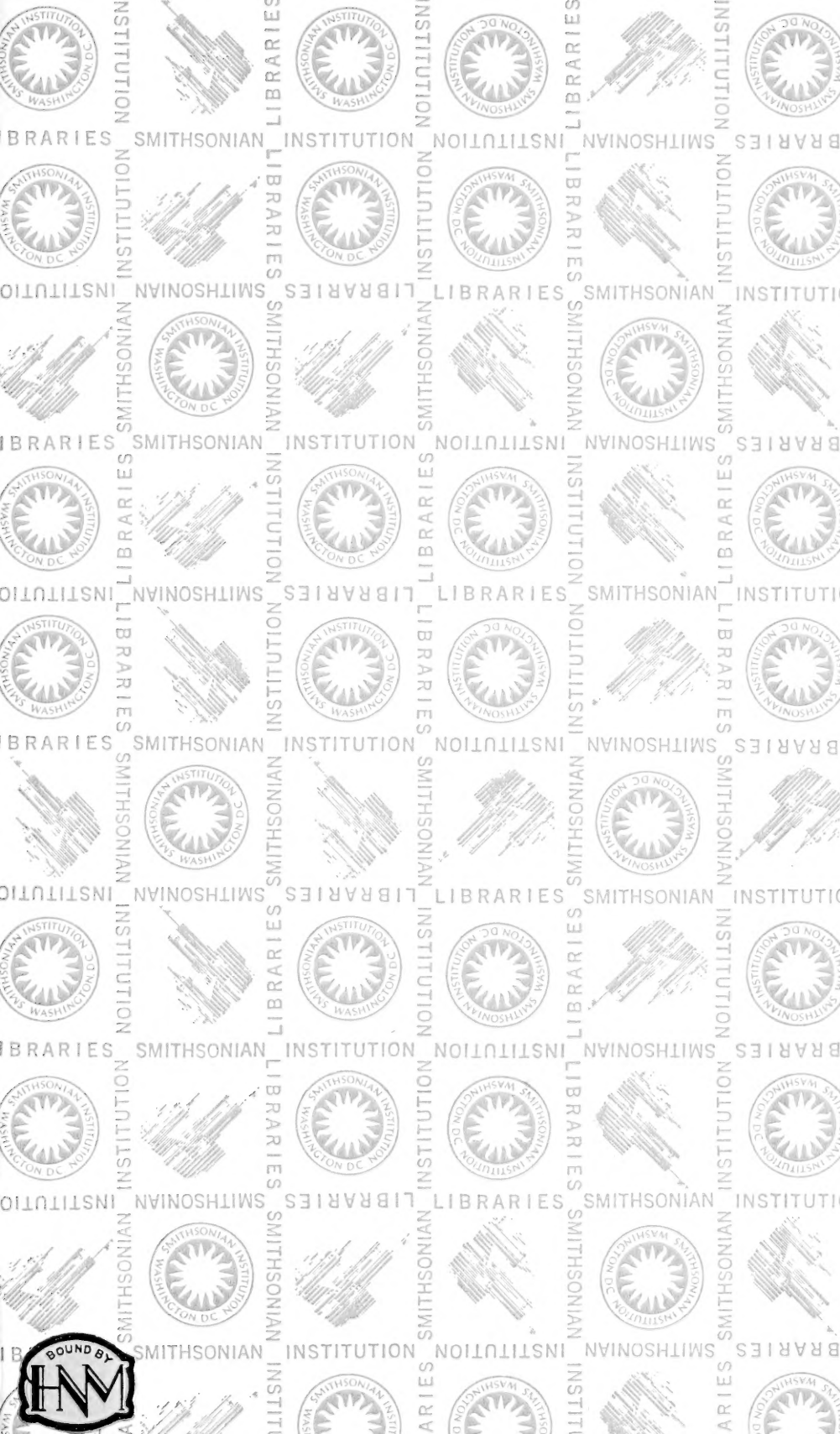
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